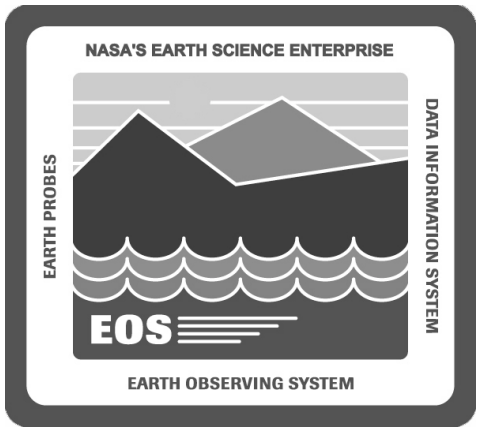
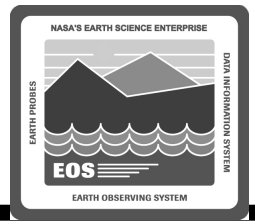


RESOURCE PLANNING

ECS Release 5B Training

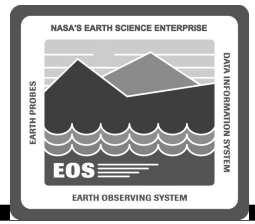
625-CD-507-002

Overview of Lesson



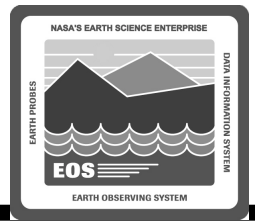
- **Introduction**
- **Resource Planning Concepts**
- **Launching and Shutting Down Resource Planning Applications**
- **Defining Resources**
- **Creating a Resource Reservation Request**
- **Editing a Resource Reservation Request**
- **Reviewing Resource Timelines**
- **Tuning System Parameters**
- **Troubleshooting Resource Planning Problems**

Overview of Lesson (Cont.)



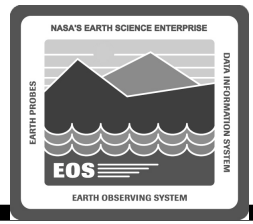
- **Practical Exercise**
  - **Launching Resource Planning Applications**
  - **Shutting Down Resource Planning Applications**
  - **Synchronizing Resource Listings**
  - **Determining Actual Processing Resources to be Added to the Resource Planning List**
  - **Adding Resources to the Resource Planning List**
  - **Modifying Resources on the Resource Planning List**
  - **Deleting Resources from the Resource Planning List**
  - **Creating a Resource Reservation Request**
  - **Editing/Modifying a Resource Reservation Request**

Overview of Lesson (Cont.)



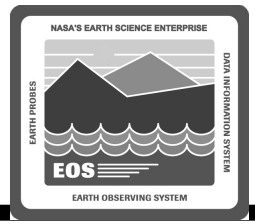
- **Practical Exercise (Cont.)**
  - **Validating or Rejecting a Resource Reservation Request**
  - **Approving Resource Reservation Requests**
  - **Committing Resource Reservation Requests**
  - **Deleting a Resource Reservation Request**
  - **Reviewing a Resource Timeline**
  - **Modifying System Parameters in Configuration Files**
  - **Troubleshooting Resource Planning Problems**

Objectives



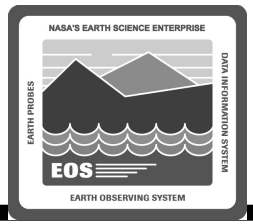
- **OVERALL:**
  - **Develop proficiency in the procedures that apply to resource planning operations**
- **SPECIFIC:**
  - **Describe the general steps in the resource planning process**
  - **Perform the steps involved in...**
    - » **launching resource planning applications**
    - » **shutting down resource planning applications**
    - » **synchronizing resource listings**
    - » **determining actual processing resources to be added to the resource planning list**
    - » **adding resources to the resource planning list**
    - » **modifying resources on the resource planning list**

Objectives (Cont.)



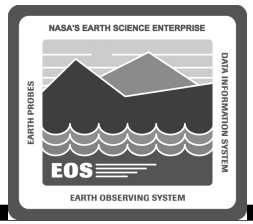
- **SPECIFIC (Cont.):**
  - **Perform the steps involved in...**
    - » **deleting resources from the resource planning list**
    - » **creating a resource reservation request**
    - » **editing/modifying a resource reservation request**
    - » **validating or rejecting a resource reservation request**
    - » **approving resource reservation requests**
    - » **committing resource reservation requests**
    - » **deleting a resource reservation request**
    - » **reviewing a resource timeline**
    - » **modifying system parameters in configuration files**
    - » **troubleshooting resource planning problems**

Objectives (Cont.)



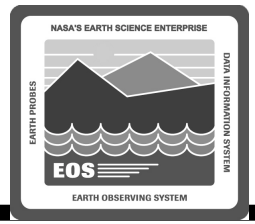
- **STANDARDS:**
  - **Lesson content (e.g., procedures in the lesson)**
  - **Mission Operation Procedures for the ECS Project - 611-CD-510-001**

Resource Planning Concepts



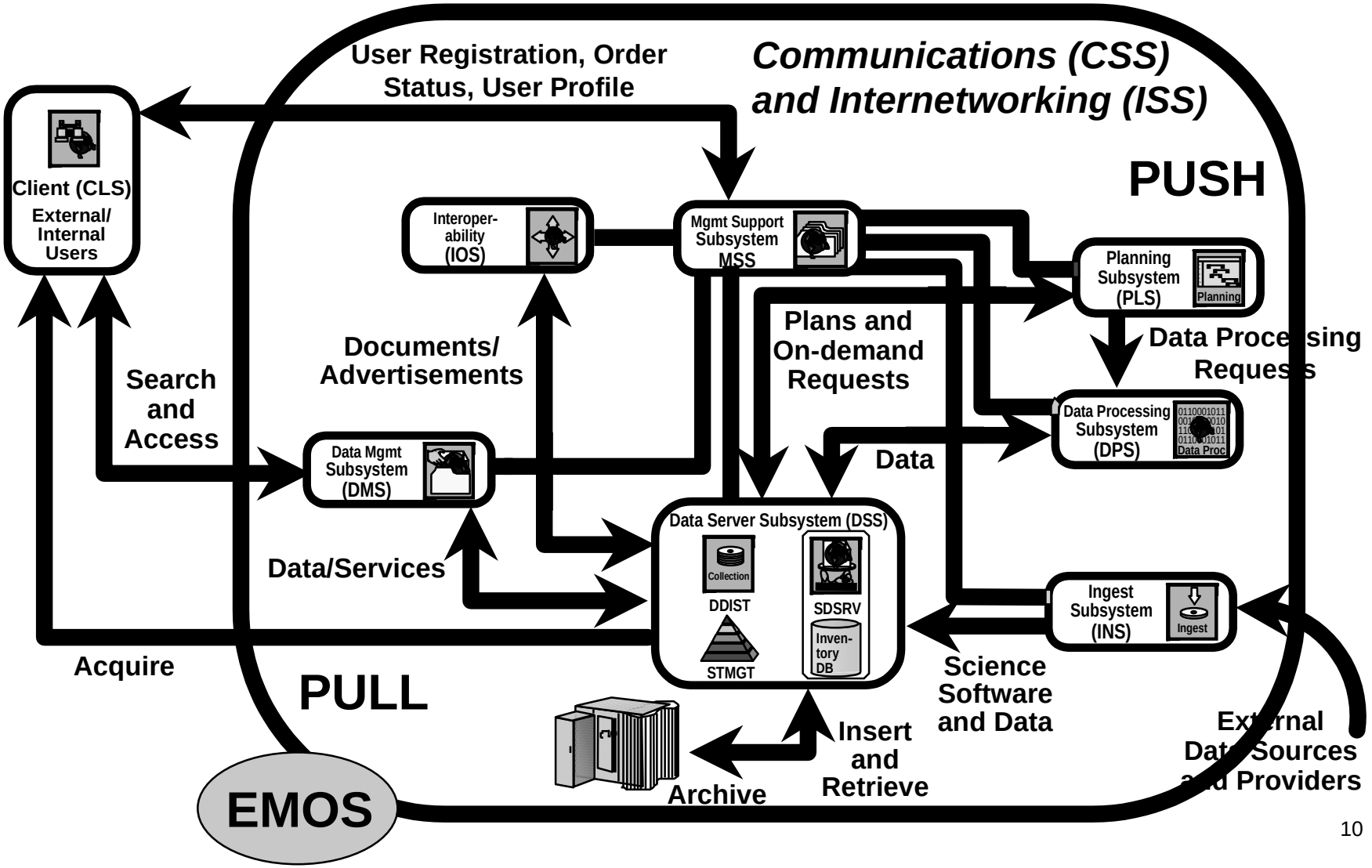
- **ECS Context**
  - **ECS resource planning process is accomplished at the Distributed Active Archive Centers (DAACs)**
  - **People involved in resource planning activities are…**
    - » **Resource Planner**
    - » **Resource Manager**
    - » **personnel requesting the use of DAAC production resources for non-production-related purposes**

Resource Planning Concepts (Cont.)

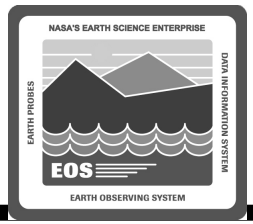


- **ECS Context (Cont.)**
  - **Resource Planner**
    - » **defines resources in the Planning and Data Processing Subsystems' (PDPS) database**
    - » **develops proposed resource plans based on resource reservation requests for non-production-related activities**
  - **Resource Manager**
    - » **puts a resource plan into effect**
  - **Personnel who have a need for Planning Subsystem or Data Processing Subsystem resources**
    - » **submit requests for time on specified resources to accomplish the non-routine activities that they plan to undertake**

ECS Context Diagram

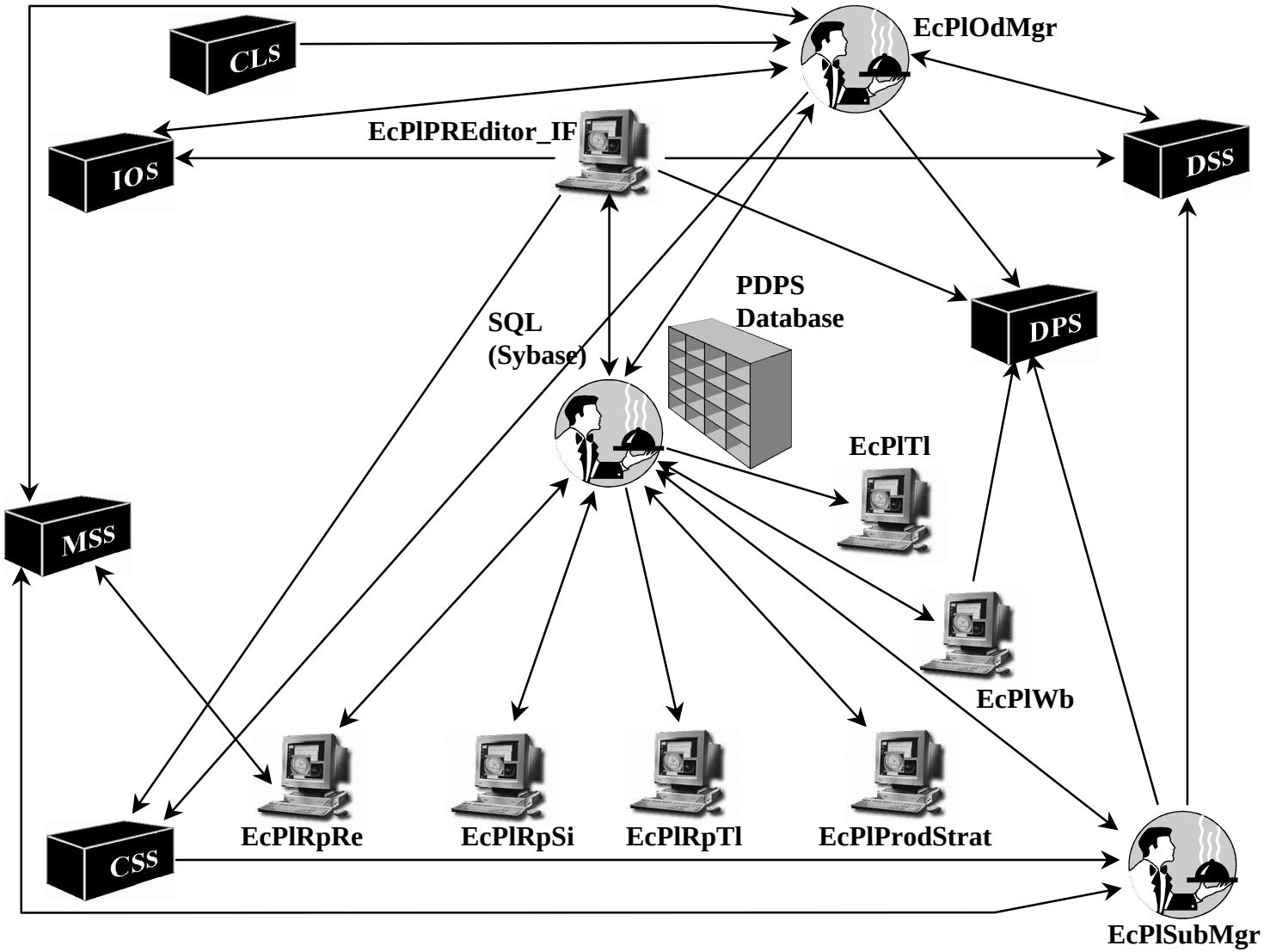


Resource Planning Concepts (Cont.)

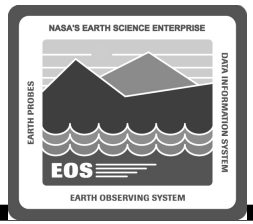


- **Planning Subsystem**
  - **provides a mechanism for accomplishing the following general functions:**
    - » **Defining DAAC production resources**
    - » **Scheduling production resources for non-production-related activities**
    - » **Defining data processing jobs to be performed at the DAAC**
    - » **Generating efficient plans for scheduling defined data processing jobs**

Planning Architecture

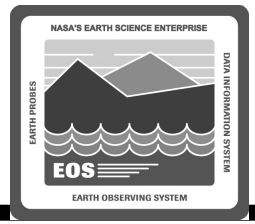


Resource Planning Concepts (Cont.)



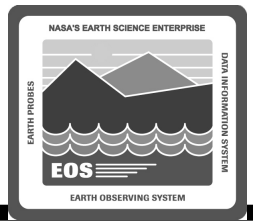
- **Planning Subsystem**
  - **DAAC personnel have access to the resource planning functions of the Planning Subsystem primarily through components of the Resource Planning Workbench in the Planning Subsystem**
    - » **Resource Scheduler (Scheduling Interface)**
    - » **Resource Editor**

Resource Planning Concepts (Cont.)



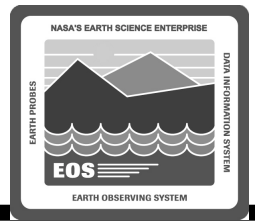
- **PLANG is the Planning Subsystem computer software configuration item (CSCI)**
  - **Resource Planning Workbench**
    - » **Resource Editor (EcPlRpRe)**
    - » **Resource Scheduler (EcPlRpSi)**
    - » **Resource Reservation Planning Master Timeline GUI (EcPlRpTl)**
  - **Production Request Editor (EcPlPREditor)**
  - **Production Planning Workbench**
    - » **Planning Workbench GUI (EcPlWb)**
    - » **Production Strategies GUI (EcPlProdStrat)**
    - » **Planning Master Timeline (EcPlTl)**

Resource Planning Concepts (Cont.)



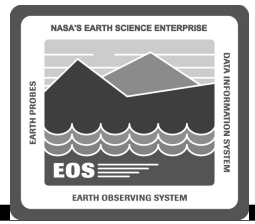
- **PLANG (Cont.)**
  - **On-Demand Manager (EcPlOdMgr)**
  - **Subscription Manager (EcPlSubMgr)**
  - **Sybase Structured Query Language (SQL) Server**
  - **Message Handler (EcPlMsh)**
  - **System Name Server (EcPlSns)**
  - **Resource Model (EcPlRpRm, EcPlRm)**

Resource Planning Concepts (Cont.)



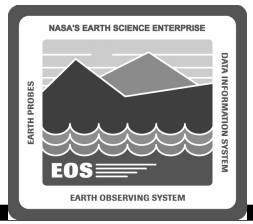
- **PLANG (Cont.)**
  - **Start-up and shutdown scripts used by planning personnel (/usr/ecs/*MODE*/CUSTOM/utilities directory)**
    - » **EcPlSomeStart**
    - » **EcPlAllStart**
    - » **EcPlPRE_IFStart**
    - » **EcPlProdStratStart**
    - » **EcPlRpAllStart**
    - » **EcPlRpReStart**
    - » **EcPlRpSiStart**
    - » **EcPlSubsEditStart**
    - » **EcPlTlStart**
    - » **EcPlWbStart**

Resource Planning Concepts (Cont.)



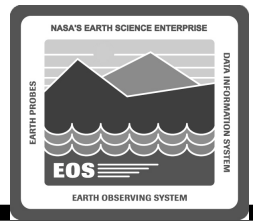
- **PLANG (Cont.)**
  - **Start-up and shutdown scripts used by planning personnel (/usr/ecs/*MODE*/CUSTOM/utilities directory) (Cont.)**
    - » **EcDpPrQaMonitorGUIStart**
    - » **EcPlSlay**
    - » **EcPlSlayAll**
    - » **EcPlRpSlayAll**

Resource Planning Concepts (Cont.)



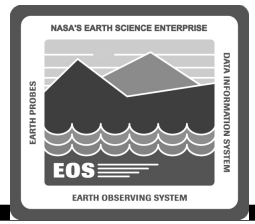
- **PLANG (Cont.)**
  - **Start-up scripts called by other applications (not normally invoked directly by planning personnel)**
    - » **EcPlMshStart**
    - » **EcPlRmStart**
    - » **EcPlRpRmStart**
    - » **EcPlSnsStart**
    - » **EcPlStart**
    - » **EcPlRpFetchBaseline**

Resource Planning Concepts (Cont.)



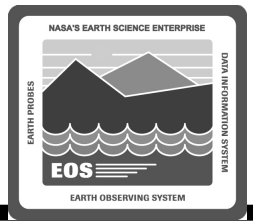
- **PLANG (Cont.)**
  - **Other scripts**
    - » **EcPlCdsPingServers**
    - » **EcPlDbClean**
    - » **EcPlDbBuild**
    - » **EcPlDbDrop**
    - » **EcPlDbDump**
    - » **EcPlDbMigrate**
    - » **EcPlDbPatch**
    - » **reset_db**
    - » **list_db**
    - » **save_db**

Resource Planning Concepts (Cont.)



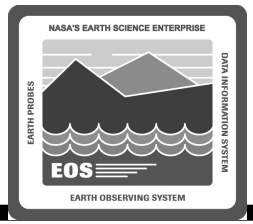
- **Resource Definition and Resource Scheduling Processes**
  - **Objective is to define and control reservations for non-routine "ground events"**
    - » **Testing**
    - » **Corrective maintenance**
    - » **Preventive maintenance**
    - » **System upgrades**

Resource Planning Concepts (Cont.)



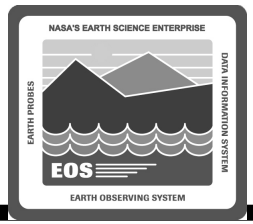
- **Resource Definition and Resource Scheduling Processes (Cont.)**
  - **Resource planning affects resources that are scheduled through production planning**
    - » **Resource planning and production planning are interdependent**
  - **Resource planning occurs on a…**
    - » **Biweekly basis for 30-day plans**
    - » **Weekly basis for 10-day plans**
    - » **Daily basis**
  - **Ground events can be entered at any time**
  - **Important point:**
    - » **It is necessary to be aware of the anticipated processing load and upcoming maintenance events about the next month**

Resource Planning Concepts (Cont.)



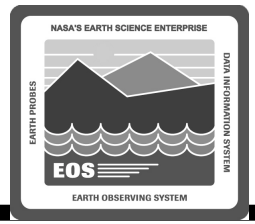
- **Resource Definition Process**
  - **Original design was to initialize the resource planning list in the PDPS database with resource data from the Baseline Manager database**
    - » **Synchronize processing resource data in the two databases**
  - **Resources could be added to or deleted from the resource planning list in the PDPS database without affecting the Baseline Manager database**
    - » **Consequently, the Resource Planner would be able to specify resources that were not currently usable but would become available in the future**
    - » **Furthermore, the Resource Planner would be able to reset resource planning to the baseline at any time (as the baseline changed)**

Resource Planning Concepts (Cont.)



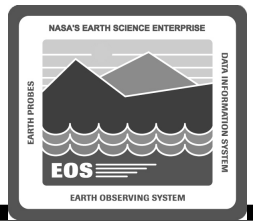
- **Resource Definition Process (Cont.)**
  - **Generally preferable to define resources manually**
    - » **Quantity of processing resources is not very great**
    - » **Resources can be defined to the PDPS database in a fairly short period of time**

Resource Planning Concepts (Cont.)



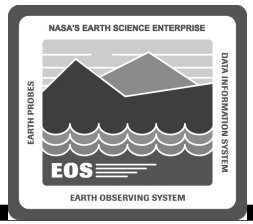
- **Resource Definition Process (Cont.)**
  - **ECS resource definitions**
    - » **“Disks”**
    - » **“Virtual computers” (sets of central processing units (CPUs) and associated memory and disks)**
    - » **“Strings” (sets of virtual computers)**
    - » **“Real computers” (hosts that are composed of one or more virtual computers)**
    - » **“AutoSys” (strings associated with the production processing software)**
    - » **Generic “hardware”**

Resource Planning Concepts (Cont.)



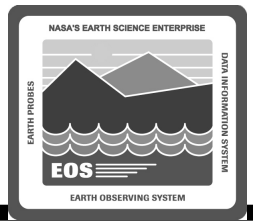
- **Resource Definition Process (Cont.)**
  - **General process used for manually defining production resources**
    - » **Determine what production resources are available**
    - » **Determine the distribution of resources among operating modes**
    - » **Define resources for each mode using the Resource Editor GUI**

Resource Planning Concepts (Cont.)



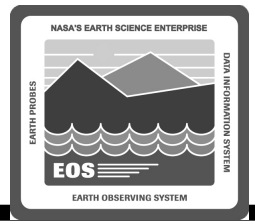
- **Resource Scheduling Roles**
  - **Resource Planner processes resource reservation requests for ground events**
  - **Resource Manager commits resource reservations**
  - **Production Planner sends committed resource reservations (ground events) to Data Processing via the Planning Workbench**
  - **Production Monitor monitors execution of ground events in processing**

Resource Planning Concepts (Cont.)



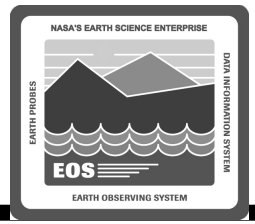
- **Resource Scheduling Process**
  - **Personnel who have a need for resources submit requests for time on specified resources to accomplish the non-routine activities that they plan to undertake**
    - » **Depending on DAAC policy, many personnel may have access to the resource planning applications for creating resource reservation requests**
    - » **Alternatively, personnel may have to contact the Resource Planner to have resource reservation requests entered for them**

Resource Planning Concepts (Cont.)



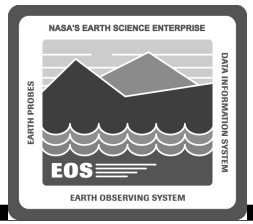
- **Resource Scheduling Process (Cont.)**
  - **Resource Planner reviews requests for resource reservations to determine if the requests are valid**
    - » **Requests include the activity description, resource(s) required, time period(s) for using the requested resource(s), and comments (e.g., explanation of variance from normal use)**
    - » **Resource Planner may decide to forward the request to a "sponsor" for validation (sponsor is someone who evaluates a resource reservation request based on relevant expertise)**
  - **If the Resource Planner or sponsor determines that the request to reserve the resource is valid, the Resource Planner "approves" it along with all other requests that have been validated**
    - » **The set of all validated resource reservation requests is considered a draft Resource Plan**

Resource Planning Concepts (Cont.)



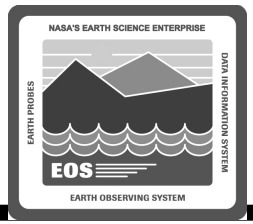
- **Resource Scheduling Process (Cont.)**
  - **The scheduling software identifies conflicts (if any) in the draft Resource Plan and alerts the Resource Planner to the problem(s)**
  - **If possible, the Resource Planner resolves all conflicts before presenting the proposed plan to the Resource Manager to have the resources committed**
    - » **When resolving conflicts, the Resource Planner may have to consult with resource requesters and the Resource Manager to ensure that the reserved resources will not have adverse effects on the DAAC's high-priority events**
  - **When the Resource Planner has achieved a conflict-free plan, it is presented to the Resource Manager to be implemented**

Resource Planning Concepts (Cont.)



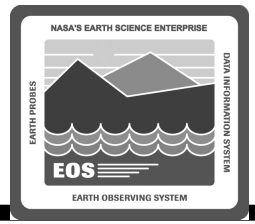
- **Resource Scheduling Process (Cont.)**
  - **The Resource Manager "commits" the resource plan, which signals the Planning Subsystem that the plan can be implemented**
    - » **Committing a plan actually involves committing all of the individual approved resource reservation requests that collectively make up the plan**
  - **All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing**

Resource Planning Concepts (Cont.)



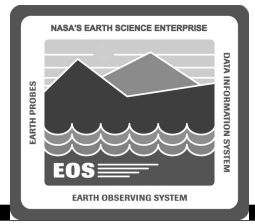
- **Resource Scheduling Process (Cont.)**
  - **In Data Processing a ground event job for each resource reservation is sent to the specified resource(s) at the indicated start time**
    - » **If a data processing job is already using the specified resource(s) at the ground event's scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job**

Launching Resource Planning Applications



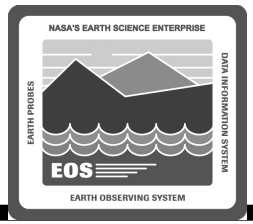
- **Resource Scheduler GUI (Scheduling Interface)**
- **Resource Editor GUI**
- **Message Handler**
- **System Name Server**
- **Resource Model**
- **Resource Reservation Planning Master Timeline GUI**

Launching Resource Planning Applications (Cont.)



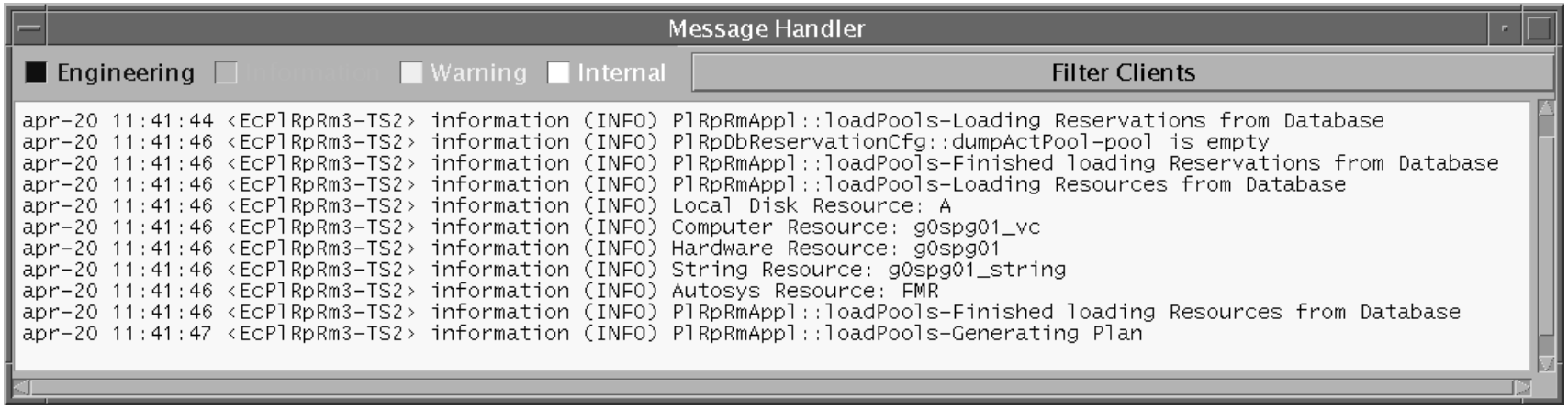
- **Access**
  - **Submitting resource reservation requests**
    - » **all ECS personnel who may need to use system resources**
  - **Validating resource reservation requests**
    - » **sponsors**
  - **All other functions**
    - » **Resource Planner**
    - » **Resource Manager**
- **Use UNIX command line to gain access to graphical user interfaces (GUIs)**

Launching Resource Planning Applications (Cont.)



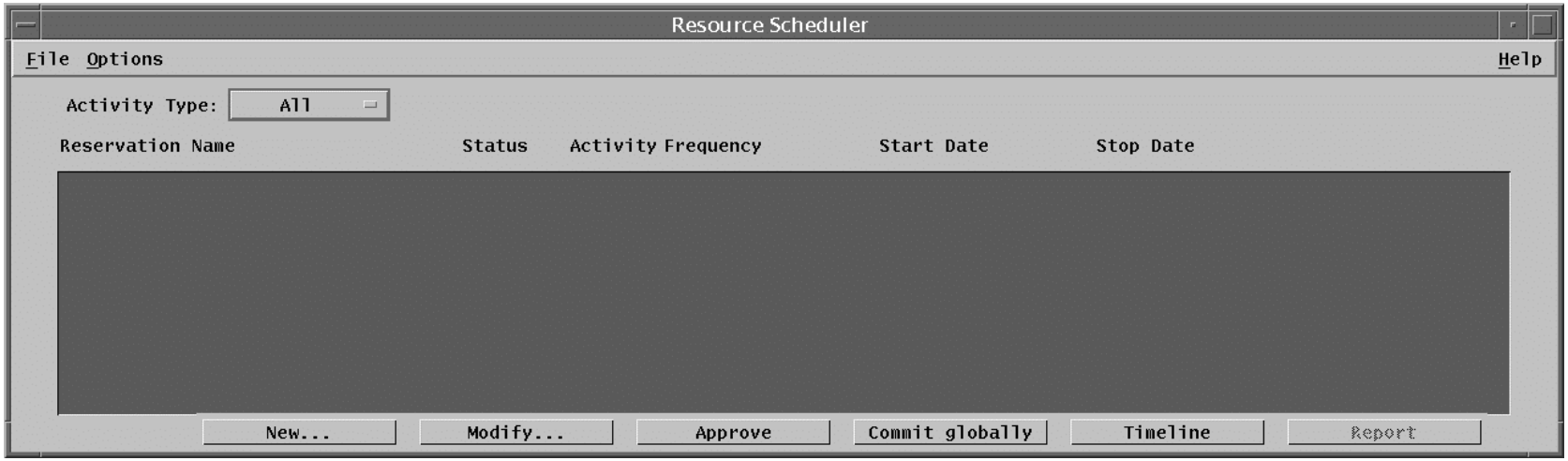
- **Procedure**
  - **Access the command shell**
  - **Set the DISPLAY environmental variable**
  - **Log in to the Planning/Management Workstation using secure shell**
  - **Set the ECS_HOME environmental variable if necessary**
  - **Type command to start Message Handler, System Name Server and Resource Model**
  - **Type command to start Resource Editor**
  - **Type command to start Resource Scheduler**

Message Handler GUI

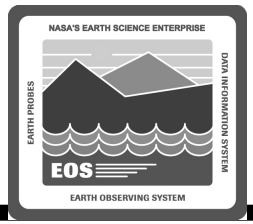


Resource Editor

Resource Scheduler

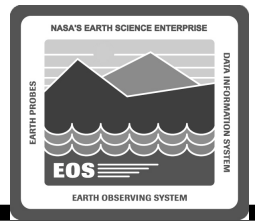


Shutting Down Resource Planning Applications



- **Shut down the resource planning processes when resource planning activities have been completed**
  - **Resource Editor**
  - **Resource Scheduler**
  - **Message Handler**
  - **System Name Server**
  - **Resource Model**
- **Allows other operators to gain access to resource planning applications**

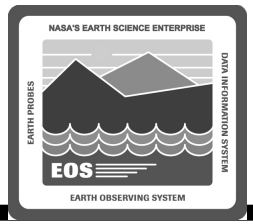
Shutting Down Resource Planning Applications (Cont.)



- **Procedure**
  - **Quit (File → Exit) Resource Editor**
  - **Quit (File → Exit) Resource Scheduler**
  - **Access UNIX command shell**
  - **Type command to shut down resource planning applications**
  - **Verify that resource planning applications are no longer running in the applicable mode**
    - » **Terminate processes individually if necessary**

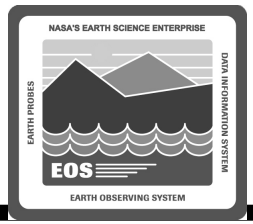
Close Application Dialogue Box

Defining Resources



- **Resource planning list of resources**
  - **Initial list can be obtained from the Baseline Manager (XRP II) database**
  - **Changes to the resource planning list do not affect the Baseline Manager database**
    - » **Facilitates planning for future activities that require resources which are not currently available**

Defining Resources (Cont.)

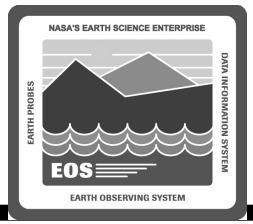


- **Resource Editor**
  - **Allows the authorized user to...**
    - » **Synchronize the resource planning list with the baseline**
    - » **Add or delete future resources not contained in the baseline**
    - » **Modify the characteristics of resources**
  - **Makes modifications to the resource planning list in the PDPS database**

Defining Resources (Cont.)

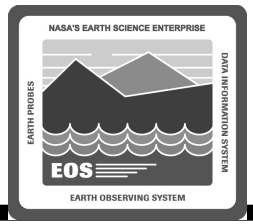
- **Synchronizing Resource Listings**
  - **Reload the Resource Definition list from the Baseline Manager database**
  - **Makes the resource planning list consistent with the Baseline Manager database**
  - **Two-step process**
    - » **Fetch Baseline — runs a Tivoli job that generates a file of configuration information used by Resource Planning**
    - » **Load Baseline — extracts the needed information from the Tivoli-generated file and loads it into the PDPS database**

Defining Resources (Cont.)



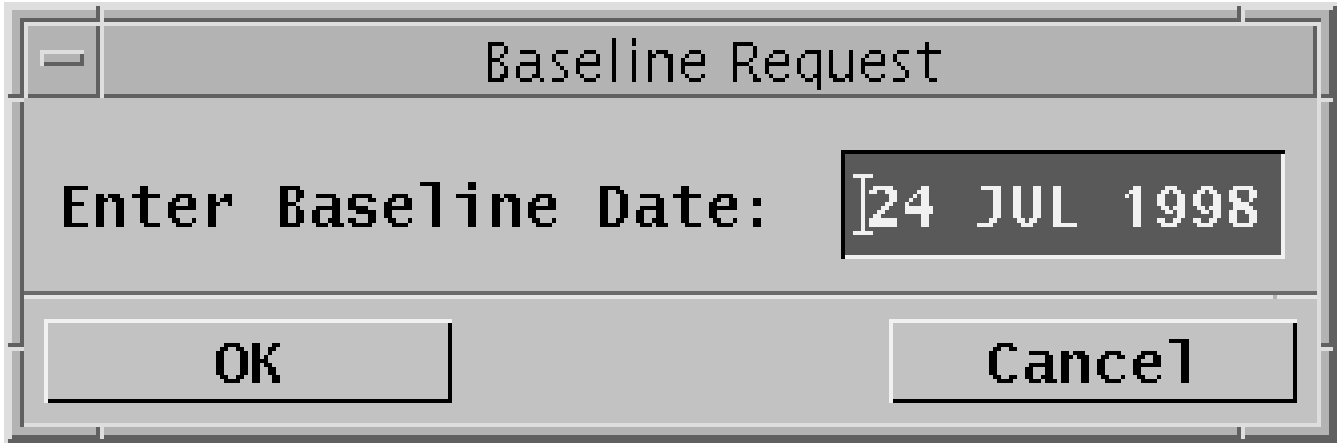
- **Synchronizing Resource Listings (Cont.)**
  - **Before attempting to synchronize resource listings, ask the local Configuration Management Administrator whether the resources have been defined in the Baseline Manager database at your site**
  - **If the resources have not been defined in the Baseline Manager, they will have to be added to the Resource Definition list as described in the procedure for Adding a Resource**

Synchronizing Resource Listings

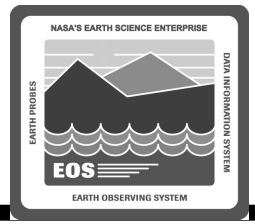


- **Procedure**
  - **Launch the Resource Editor (if not already launched)**
  - **Fetch the baseline**
  - **Load the baseline**

Baseline Request Pop-Up Window

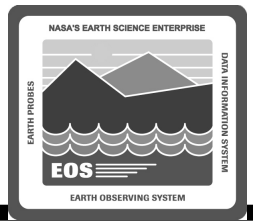


Adding or Modifying Resources



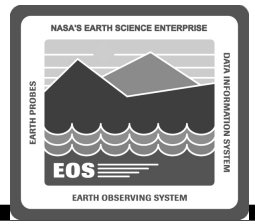
- **The Resource Editor allows the authorized operator to define resources**
- **Resource categories:**
  - **Disks**
    - » **Disk partitions that are associated with and provide temporary data storage for the input and output files used in processing**
  - **Virtual Computers**
    - » **Virtual computers composed of CPUs, random-access memory (RAM), and associated-disk(s)**
  - **Real Computers**
    - » **Physical computing devices (hosts), each of which contains one or more CPUs**

Adding or Modifying Resources (Cont.)



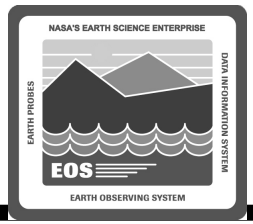
- **Resource categories (Cont.):**
  - **Strings**
    - » **Sets of one or more virtual computers**
  - **AutoSys**
    - » **Identifies the string(s) of virtual computers used by the production processing software**
  - **Hardware**
    - » **Any type of equipment that is not defined as a computer or disk may be defined as “hardware”**

Adding or Modifying Resources (Cont.)



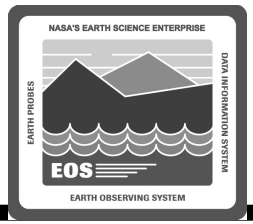
- **The ECS Operational Readiness Plan for Release 2.0 (603-CD-003-001)**
  - **Initially disk partitions at the DAACs are to be split among the operating modes**
    - » **OPS – 60%**
    - » **TS1 - 20%**
    - » **TS2 - 20%**
  - **It may be advantageous to reserve some nominal percentage of the disk as a safety buffer**
    - » **e.g., two to five percent**
  - **Critical to ensure that the sum of the disk space assigned to the various modes is no more than the total disk space available**

Adding or Modifying Resources (Cont.)



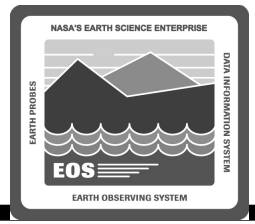
- **CPUs and RAM should be allocated among modes**
  - **No one-to-one mapping of CPU allocation with actual CPUs on the science processor**
  - **Actual CPU usage during processing is limited by the operating system (OS)**
    - » **If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time**
    - » **What is really being defined is the maximum number of DPRs that will execute at a given time**
  - **Important to monitor the load on each science processor**
    - » **CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs**

Adding or Modifying Resources (Cont.)



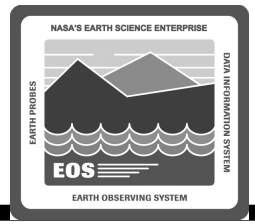
- **Random-access memory (RAM) is subject to the same considerations as CPUs**
  - **RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor**
  - **The OS takes care of true CPU and RAM allocation**
- **Throttling of the processing load through the DpPrAutoSysMaxJobs variable**
  - **Defined in the EcDpPrJobMgmt.CFG file in the /usr/ecs/MODE/CUSTOM/cfg directory on the Queuing Server (e.g., g0sps06)**
  - **If DpPrAutoSysMaxJobs in OPS mode is set at 64 (eight DPRs) and ten CPUs are defined for OPS, it would not be possible to utilize all ten CPUs**

Adding or Modifying Resources (Cont.)



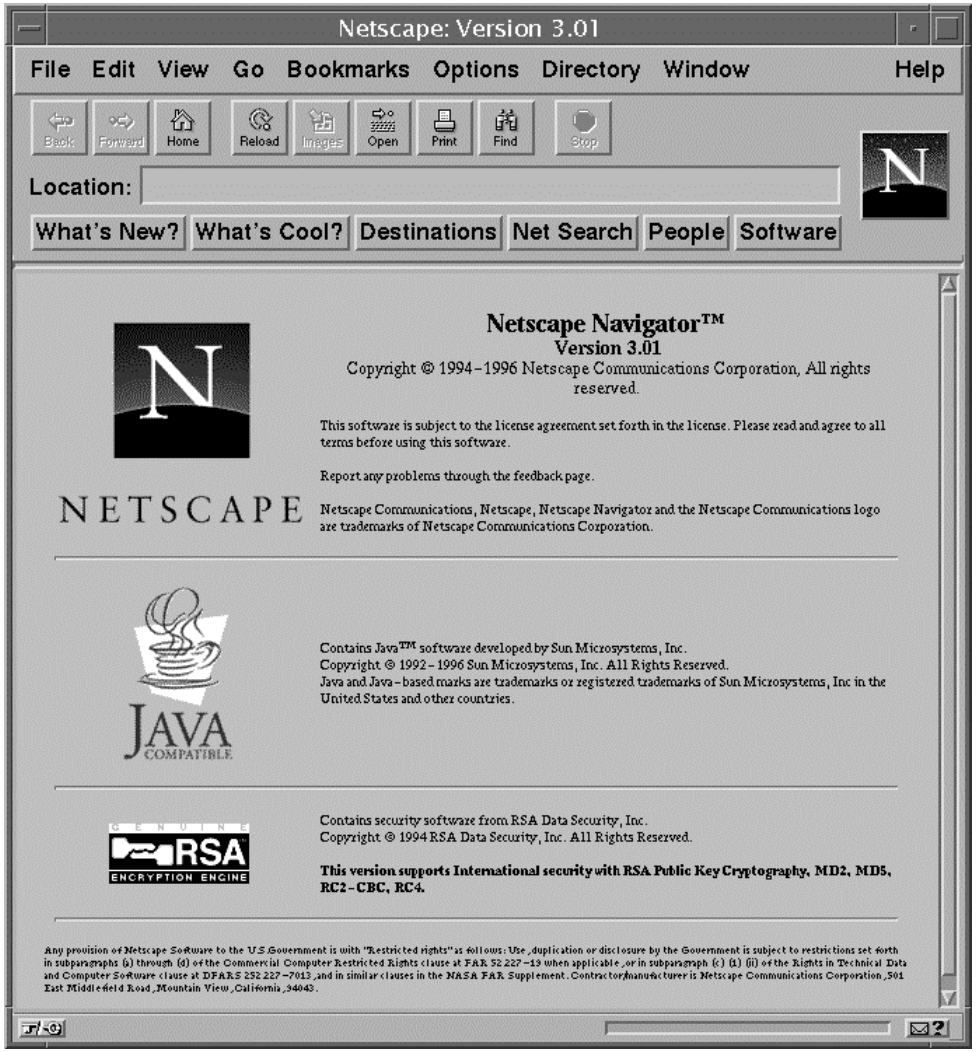
- **Determining Actual Processing Resources**
  - **The following types of information are needed:**
    - » **Host names [“real computers”]**
    - » **Number of processors [CPUs] available on each host**
    - » **Operating System (OS) for each host**
    - » **Memory [RAM] on each host**
    - » **Total disk space**
    - » **AutoSys instance(s) at the DAAC**

Adding or Modifying Resources (Cont.)

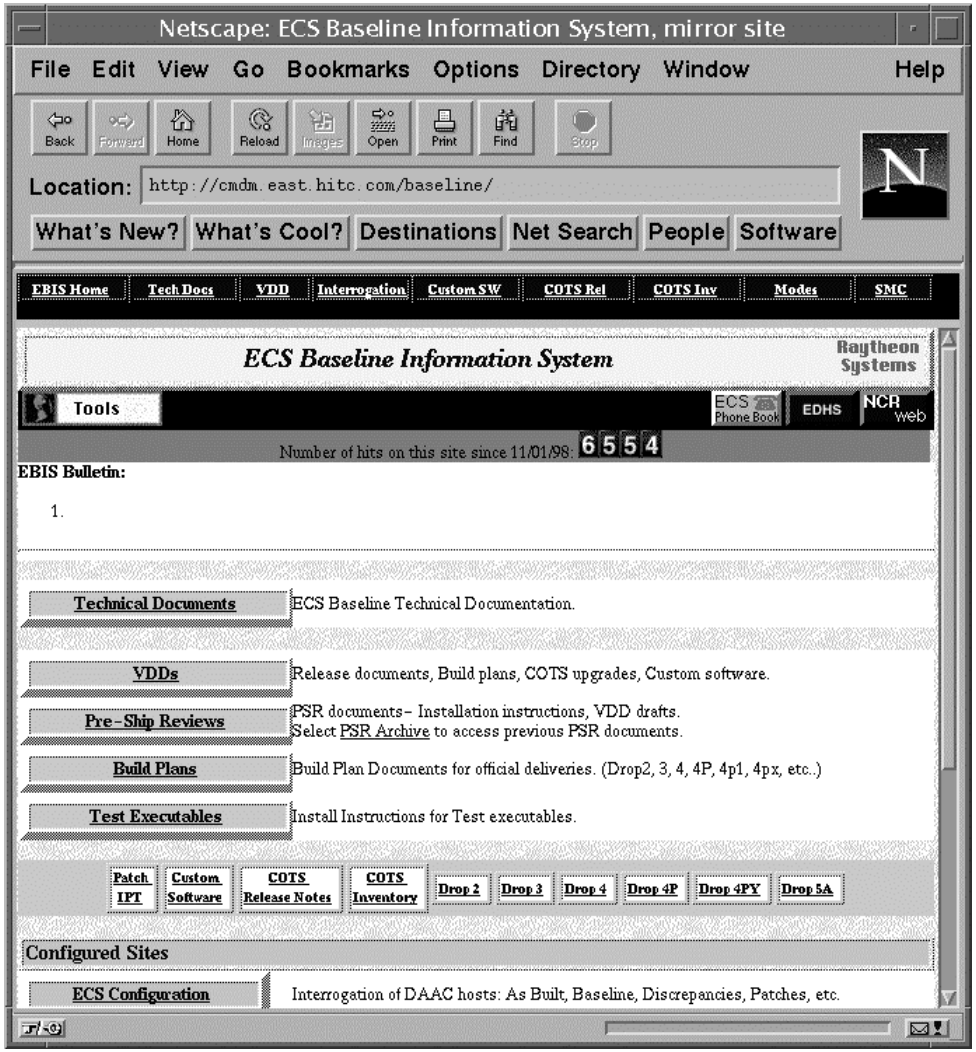


- **Procedure**
  - **Log in to the applicable Science Processor**
  - **Change to the disk mount point (subdirectory)**
  - **Identify the disk name and size by changing to the disk mount point and typing df -k .**
  - **Identify the number of processors (CPUs) and amount of RAM (type hinv)**
  - **Launch Netscape**
  - **Identify the Operating System by selecting the as-built file name corresponding to the desired host at the relevant DAAC (e.g., x0spg01.asbuilt.html)**
  - **Log in to the applicable Queuing Server host**
  - **Identify the AutoSys instance (in the “autouser” directory)**

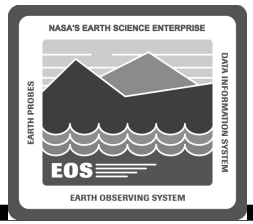
Netscape Web Browser



ECS Baseline Information System Web Page

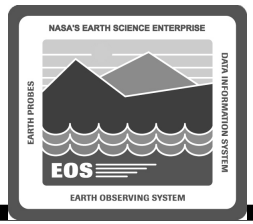


Adding or Modifying Resources (Cont.)



- **Example: Definition of Resources at DAAC X**
  - **Two science processors**
    - » **x0spg01**
    - » **x0spg02**
  - **In both cases disk space is…**
    - » **413,394,688 kilobytes**
    - » **413,394.688 megabytes**
  - **3% of each disk reserved as a safety buffer**
    - » **Each disk has a total of 400,992.847 megabytes functionally available for operational use**

Adding or Modifying Resources (Cont.)



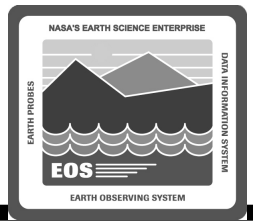
- **General Resource allocation**
  - **OPS mode**
    - » **split among x0spg01 and x0spg02**
  - **TS1 mode**
    - » **all from x0spg01**
  - **TS2 mode**
    - » **all from x0spg02**
- **CPU allocation**
  - **one CPU of each science processor reserved for use by the operating system**
  - **total number of CPUs in both x0spg01 and x0spg02 is 16 each**
- **RAM allocation**
  - **total 2048 megabytes**

Adding or Modifying Resources (Cont.)

Example: Definition of Resources at DAAC X

Resource Type	Resource Name	Activity	Partition Size [mega-bytes]	Block Size [bytes]	CPUs	RAM [mega-bytes]	Oper Sys	Associated Disks/ Computers/ Strings
OPS Mode								
Disk	x0spg01_disk_OPS	Production	240595.708	1024				
Disk	x0spg02_disk_OPS	Production	240595.708	1024				
Computer	x0spg01_vc_OPS	Production			9	1228	IRIX64.6.2	x0spg01_disk_OPS
Computer	x0spg02_vc_OPS	Production			9	1228	IRIX64.6.2	x0spg02_disk_OPS
Real Computer	x0spg01	Production						x0spg01_vc_OPS
Real Computer	x0spg02	Production						x0spg02_vc_OPS
String	string_OPS	Production						x0spg01_vc_OPS x0spg02_vc_OPS
Autosys	FMR	Production						string_OPS
TS1 Mode								
Disk	x0spg01_disk_TS1	Production	160397.138	1024				
Computer	x0spg01_vc_TS1	Production			6	819	IRIX64.6.2	x0spg01_disk_TS1
Real Computer	x0spg01	Production						x0spg01_vc_TS1
String	string_TS1	Production						x0spg01_vc_TS1
Autosys	FMR	Production						string_TS1
TS2 Mode								
Disk	x0spg02_disk_TS2	Production	160397.138	1024				
Computer	x0spg02_vc_TS2	Production			6	819	IRIX64.6.2	x0spg02_disk_TS2
Real Computer	x0spg02	Production						x0spg02_vc_TS2
String	string_TS2	Production						x0spg02_vc_TS1
Autosys	FMR	Production						string_TS2

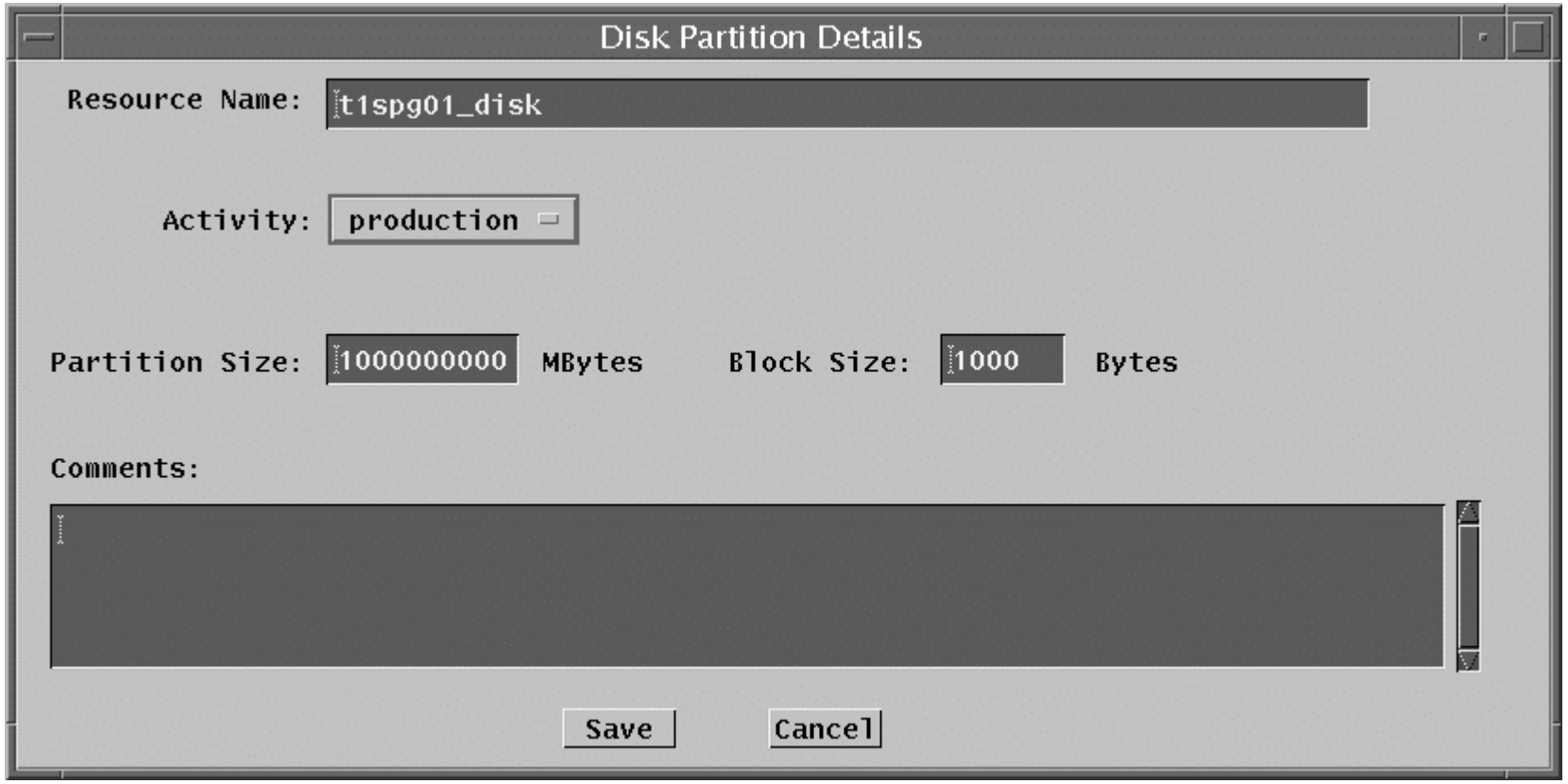
Adding a Resource



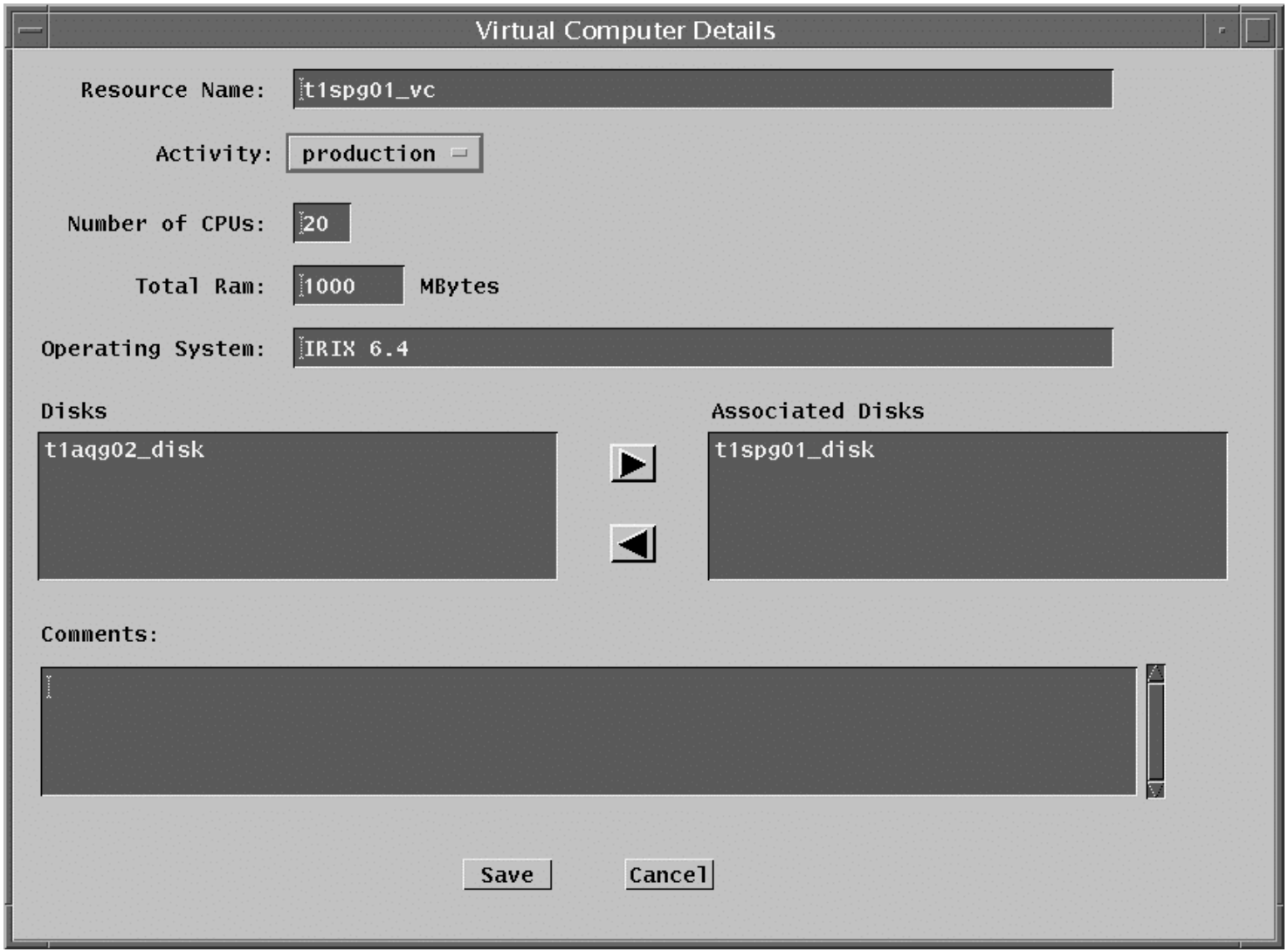
- **Procedure**
  - **Select the appropriate Resource Type from the option button on the Resource Editor**
    - » **Disk**
    - » **Virtual computer**
    - » **Real computer**
    - » **String**
    - » **AutoSys**
    - » **Hardware (generic hardware)**
  - **Click on the New… button**
  - **Perform the subordinate procedure corresponding to the selected Resource Type**
    - » **Selection of Resource Type determines which GUI appears when the New… button is activated**

Resource Editor

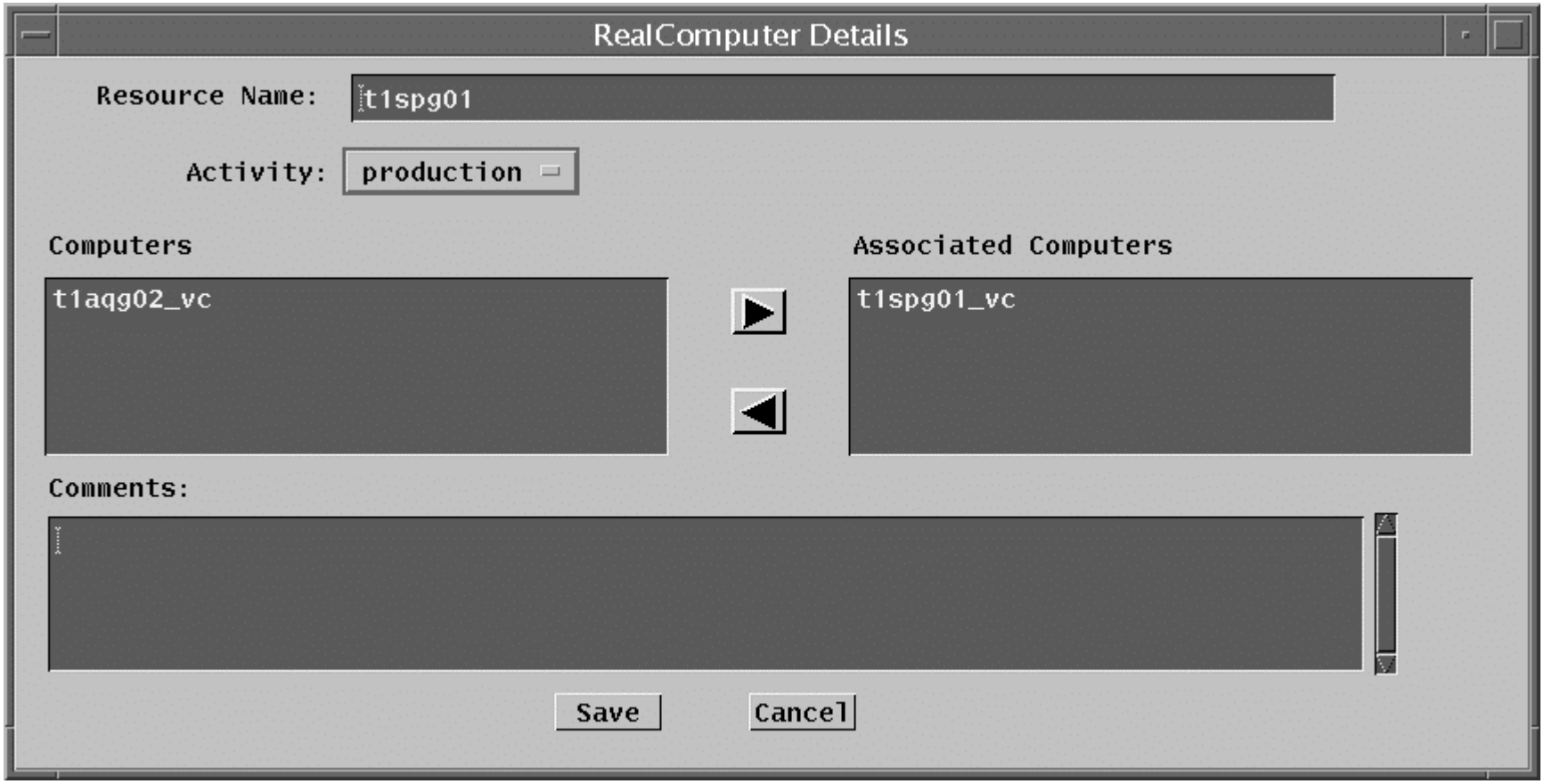
Disk Partition Details GUI



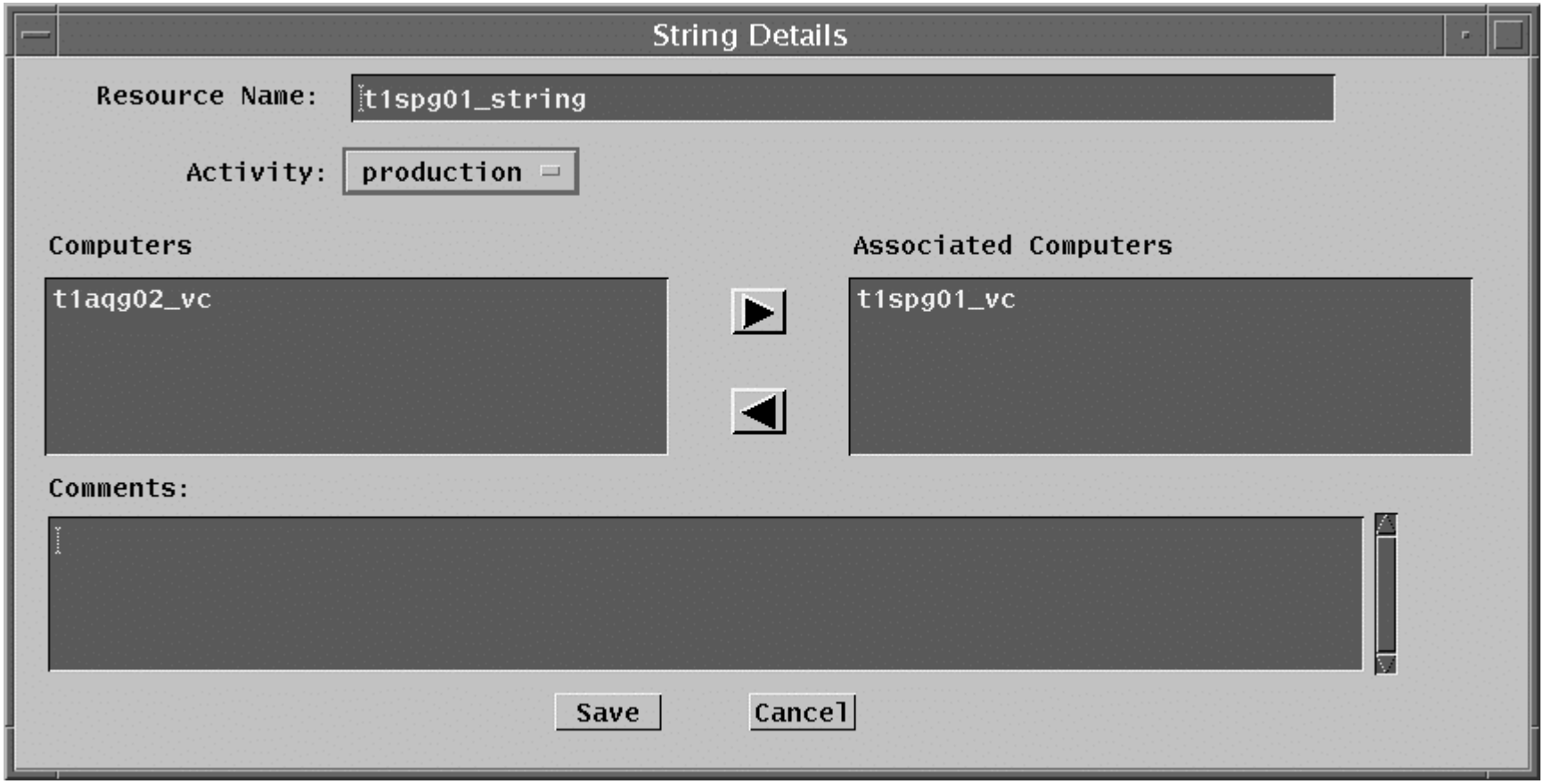
Virtual Computer Details GUI



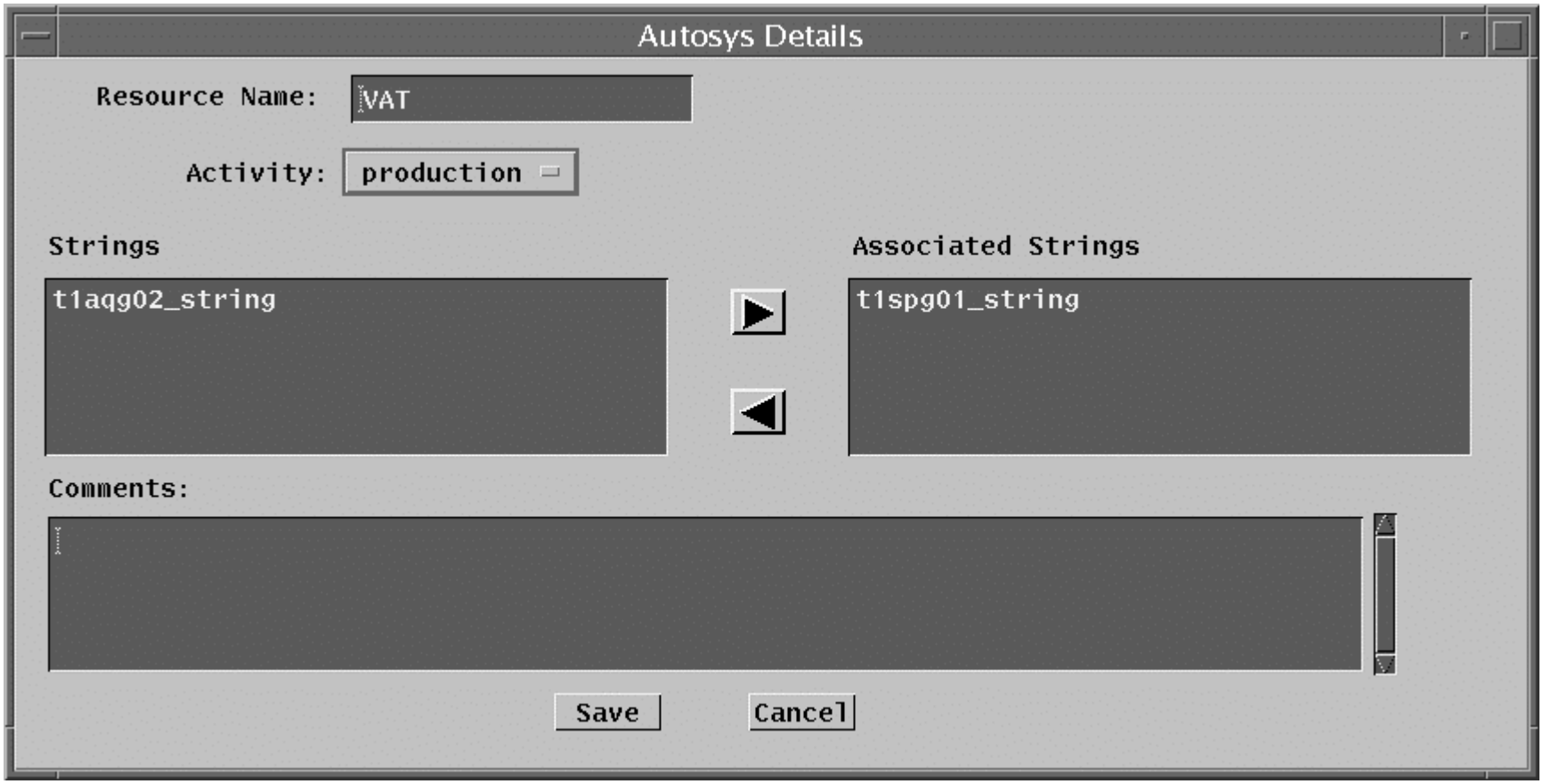
Real Computer Details GUI



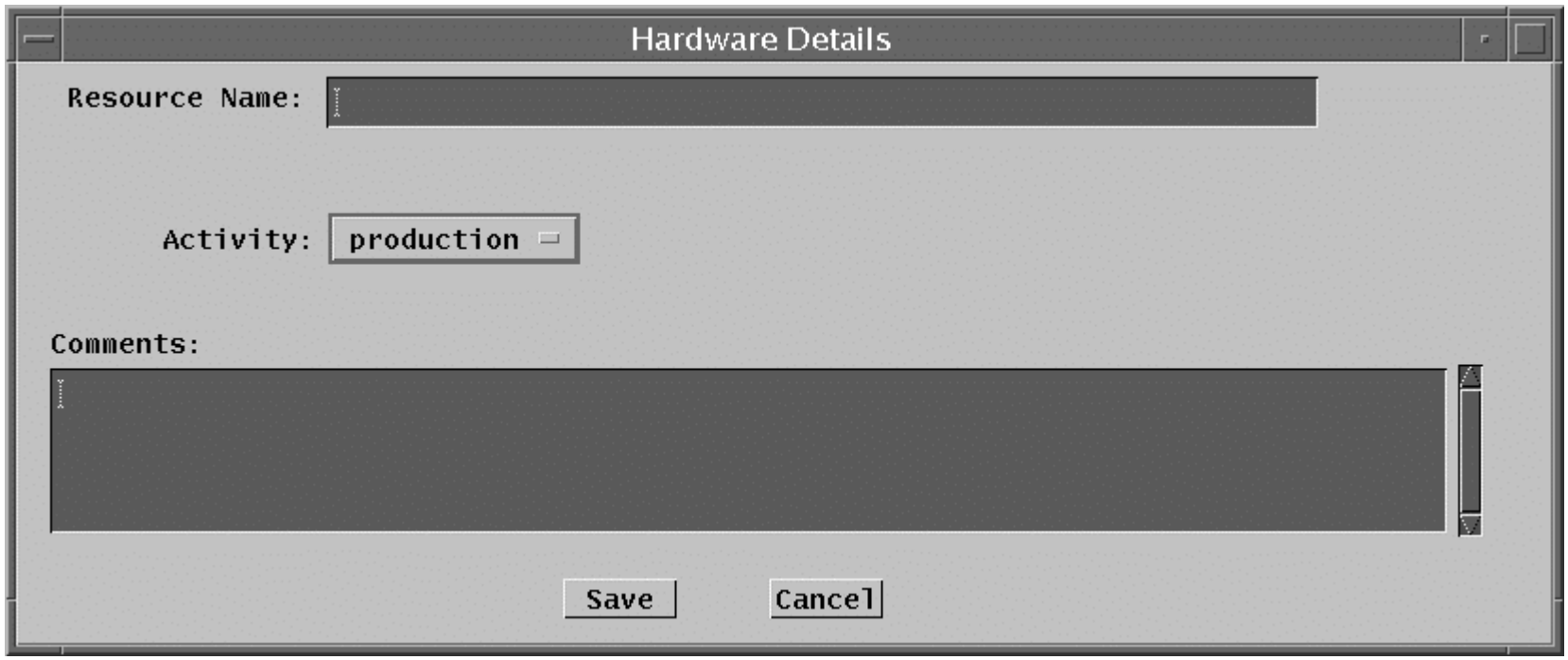
String Details GUI



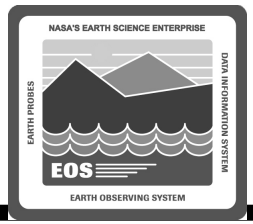
Autosys Details GUI



Hardware Details GUI

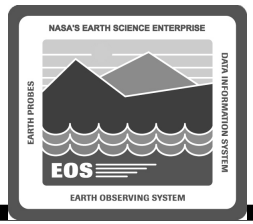


Modifying a Resource



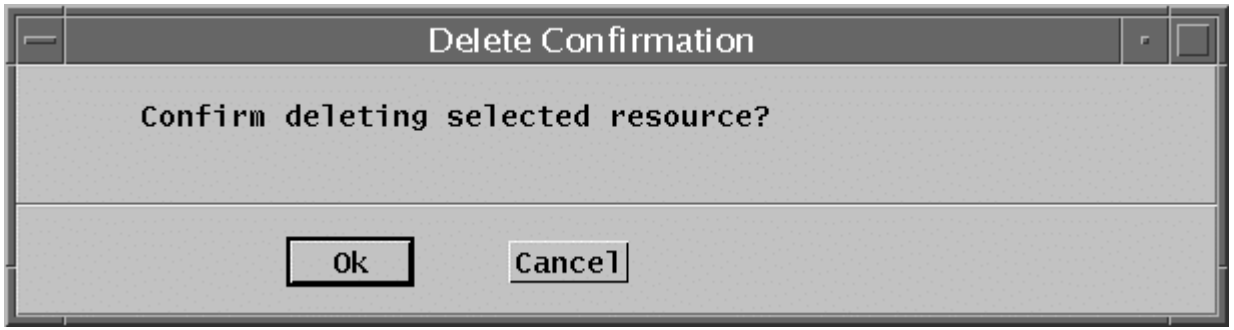
- **Procedure**
  - **Select the resource to be modified from the list displayed on the Resource Editor**
  - **Click on the Modify… button**
  - **Perform the subordinate procedure corresponding to the selected Resource Type**
    - » **Selection of Resource Type determines which GUI appears when the Modify… button is activated**
    - » **Make modifications in the same manner as entries were made when Adding a Resource**

Defining Resources (Cont.): Procedure

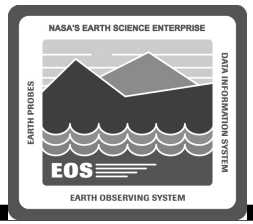


- **Deleting a Resource (Procedure)**
  - **Select the resource to be deleted from the list on the Resource Editor**
  - **Click on the “Delete” button**
  - **Click on the “Ok” button in the confirmation dialogue box**

Delete Confirmation Dialogue Box

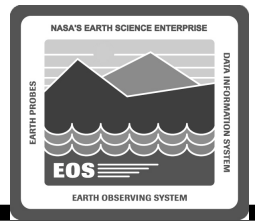


Creating a Resource Reservation Request



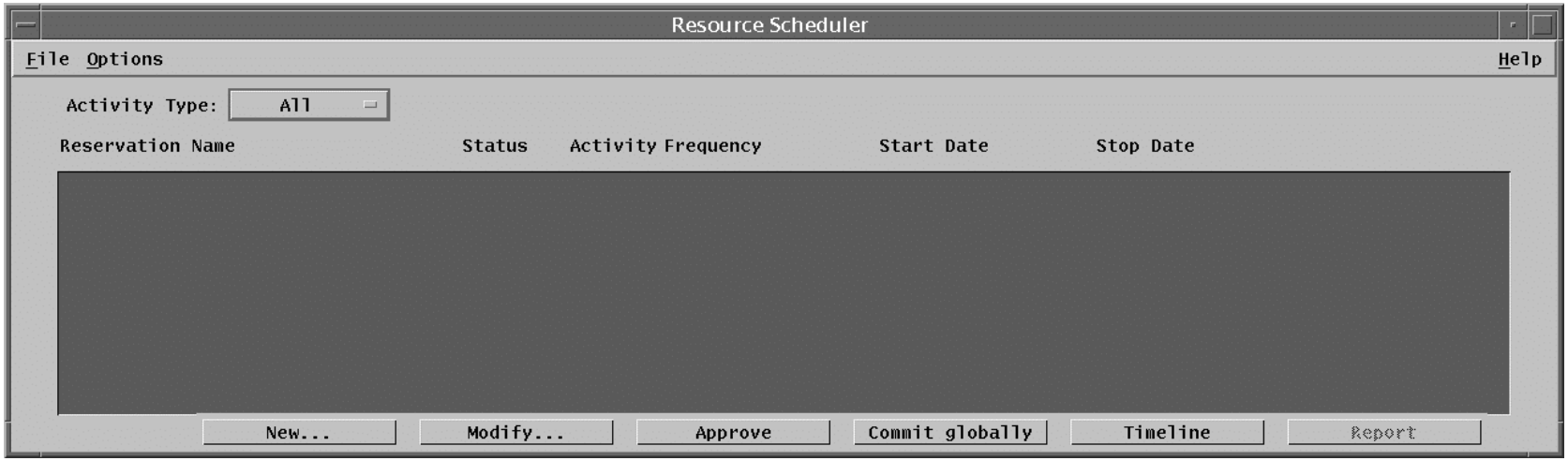
- **Resource Reservation Request describes….**
  - **Activity for which the request is being made**
  - **Resources to be dedicated to the activity**
  - **When/how often the activity will occur**

Creating a Resource Reservation Request (Cont.)

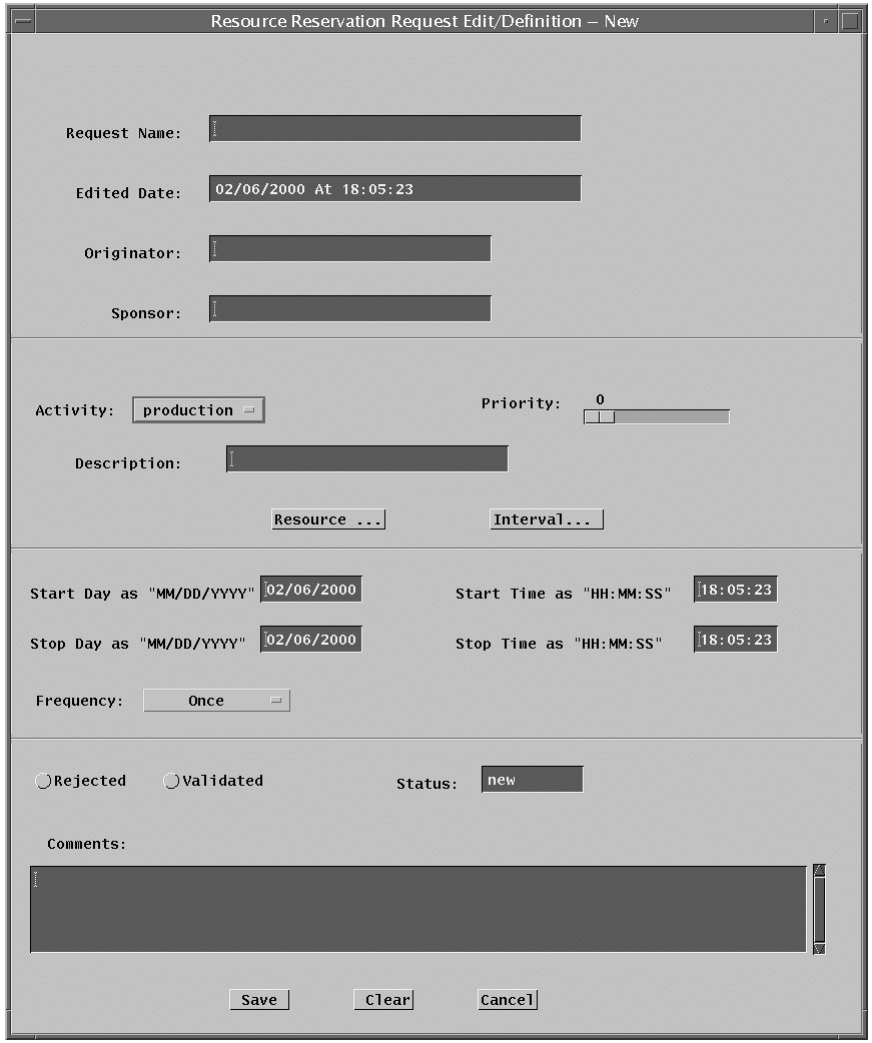


- **Procedure**
  - **Gain access the Resource Reservation Request Edit/Definition GUI from the Resource Scheduler**
    - » **Click on the New… button**
  - **Specify activity for which the request is being prepared (include a description)**
  - **Set the priority of the requested activity**
  - **Select resources (separate procedure section)**
  - **Enter duration information**
  - **Select frequency (separate procedure section)**
  - **Enter relevant comments**
  - **Save the request**

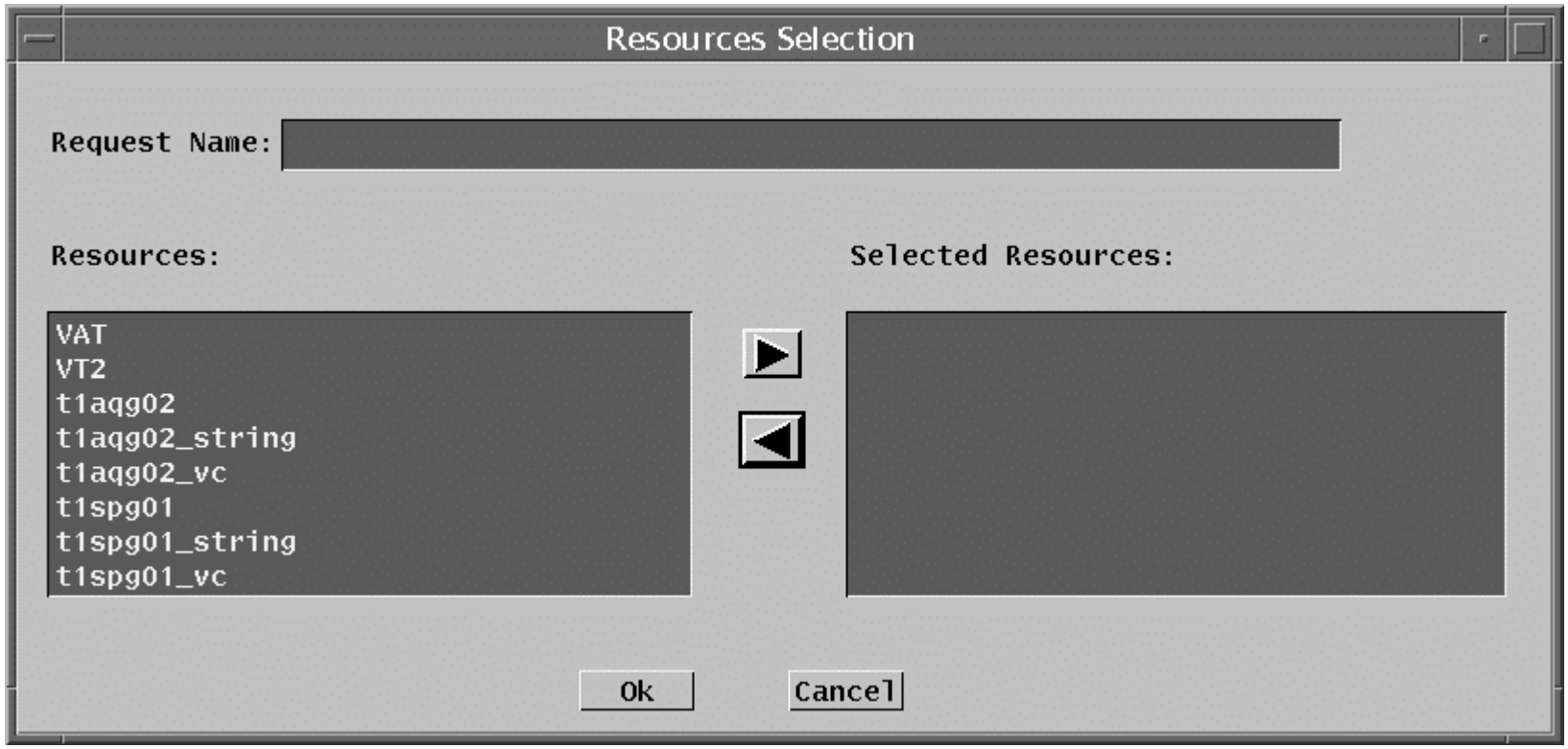
Resource Scheduler



Resource Reservation Request Edit GUI



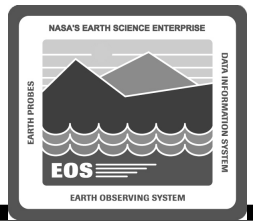
Resources Selection GUI



Selecting Frequency

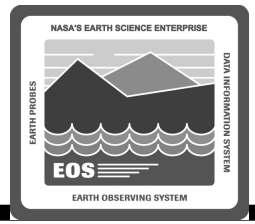
- **Procedure**
  - **Click on the Frequency option button and select the appropriate frequency**
  - **If Every_?_Days was selected, type the number of days between actions in the field to the right of the Frequency button**
  - **Return to the appropriate procedure**
    - » **Creating a Resource Reservation Request**
    - » **Editing a Resource Reservation Request**

Editing a Resource Reservation Request



- **Editing may be needed in response to any of the following factors (for example):**
  - **activities related to evaluation of the resource reservation request for validation purposes**
  - **change in the activity/event for which the resource reservation request was prepared**
  - **addition or deletion of resources**
  - **modification of intervals for recurring ground events**
  - **resource conflicts**

Editing a Resource Reservation Request (Cont.)

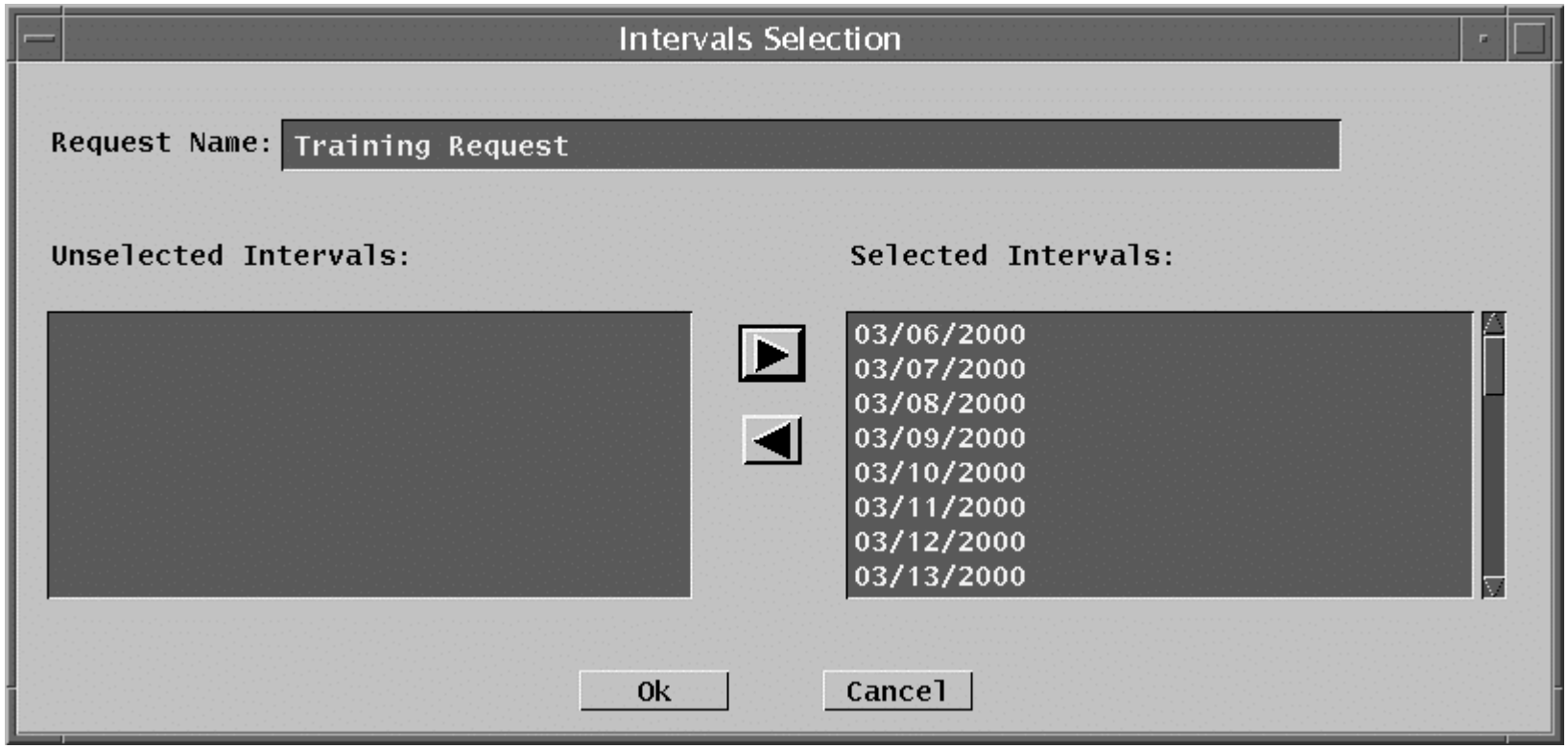


- **Procedure**
  - **select the resource reservation request to be modified from the list on the Resource Scheduler**
  - **gain access the Resource Reservation Request Edit/Definition GUI**
    - » **click on the Modify… button**
  - **make modifications in the same manner as entries were made when Creating a Resource Reservation Request**
    - » **Status will revert to "new" when the edited resource reservation request is saved if certain types of modifications have been made (e.g., changes in the selected resources or start/stop date/time)**
    - » **deselect intervals (separate procedure section) if applicable**

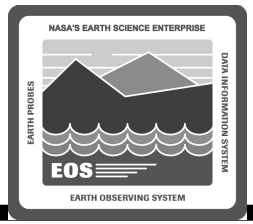
Deselecting Interval

- **Procedure**
  - **Click on the Interval… button on the Resource Reservation Request Edit/Definition GUI**
  - **Move dates between lists**
    - » **Selected Intervals**
    - » **Unselected Intervals**
  - **Click on the OK button**

Intervals Selection GUI

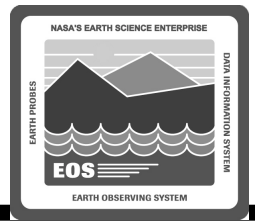


Editing a Resource Reservation Request (Cont.)



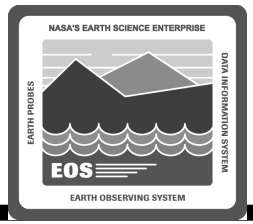
- **All resource reservation requests must be validated and approved before scheduling**
- **Validation**
  - **Is the request complete and reasonable?**
  - **Evaluation may be made by a "sponsor"**
  - **"Validated" and "Rejected" buttons on the Resource Reservation Request Edit/Definition GUI**

Editing a Resource Reservation Request (Cont.)



- **Approval process**
  - **Sponsor has validated request**
  - **Resource Planner submits request to PDPS for approval**
  - **If the system detects conflicts…**
    - » **A dialog box pops up indicating that there are conflicts to be resolved**
    - » **The Resource Planner resolves the conflicts, (in consultation with the requesters and Resource Manager as needed) making modifications to resource reservation requests as necessary**
    - » **System approves a resource reservation request only when there are no scheduling conflicts**
  - **Later the Resource Manager will review and "commit" the set of approved resources**

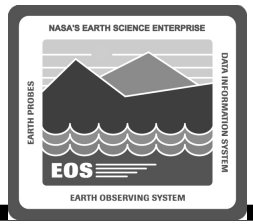
Approving a Resource Reservation Request



- **Procedure**
  - **Select the resource reservation request to be approved from the list on the Resource Scheduler**
  - **Click on the "Approve" button on the Resource Scheduler**
    - » **Request status changes to "approved" unless there are conflicts**
  - **Resolve conflicts (modify or delete resource reservation requests as necessary)**

PlRpSiMsgBox_popup (Approval Failed) Dialogue Box

Committing and Deleting Resource Reservation Requests

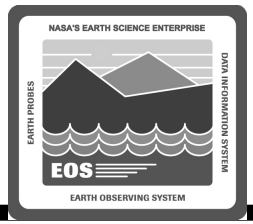


- **Committing Resource Reservation Requests**
  - **Validated**
  - **Approved**
  - **No conflicts**
  - **"Commit globally" button on the Resource Scheduler**
  - **All resource reservation requests with a status of "Approved" have their status changed to "Committed" at the same time**
  - **All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing**

Committing and Deleting Resource Reservation Requests

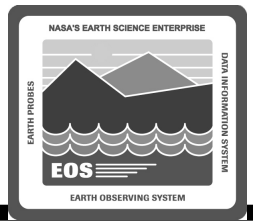
- **Committing Resource Reservation Requests (Cont.)**
  - **In Data Processing a "ground event" job for each resource reservation is sent to the specified resource(s) at the indicated start time**
    - » **If a data processing job is already using the specified resource(s) at the ground event's scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job**

Committing and Deleting Resource Reservation Requests



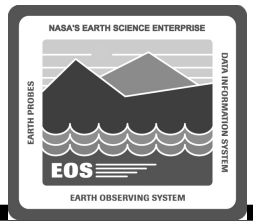
- **Deleting a Resource Reservation Request: Procedure**
  - **Select resource reservation request to be deleted**
  - **Select File → Delete**
    - » **Entry for the resource reservation request is deleted from the GUI**

Reviewing Resource Timelines



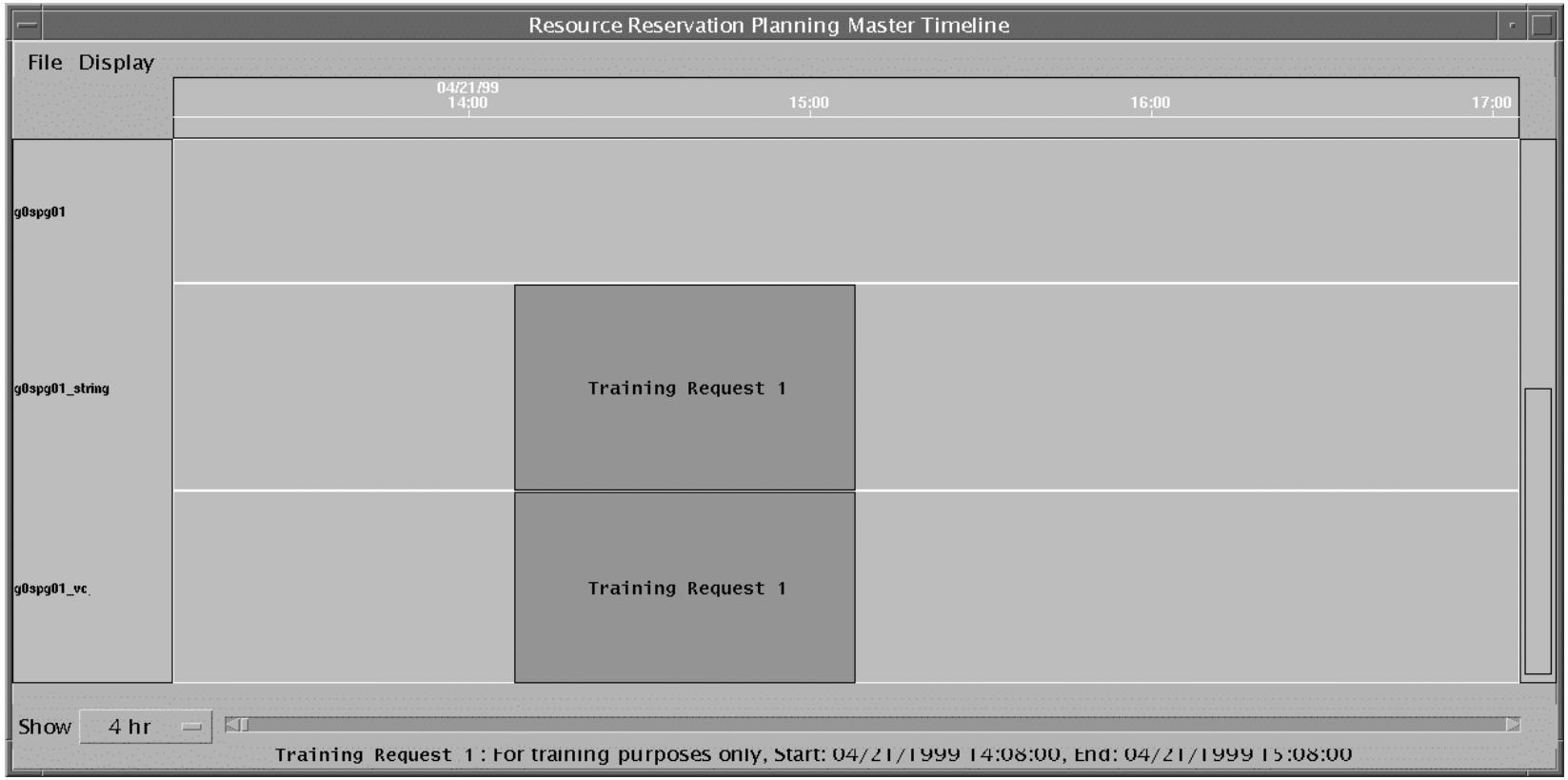
- **Reviewing a Resource Timeline**
  - **"Timeline" button on the Resource Scheduler**
    - » **set of resources, arranged along the left side of the screen**
    - » **period of time is indicated across the top edge of the screen**
    - » **use of a resource over a period of time is represented by "resource reservation" bars across the screen**
    - » **bar represents a time period during which a reservation has been made for the resource**
    - » **when there is no reservation affecting a particular resource, it is available for its default activity**

Reviewing a Resource Timeline



- **Procedure**
  - **Click on the "Timeline" button on the Resource Scheduler**
  - **Adjust the Resource Timeline window size and view as necessary**
  - **Change the time scale if necessary**
  - **Change the time span if necessary**
  - **Change the set of resources to be displayed if necessary**
  - **Change the color coding of the timeline if desired**

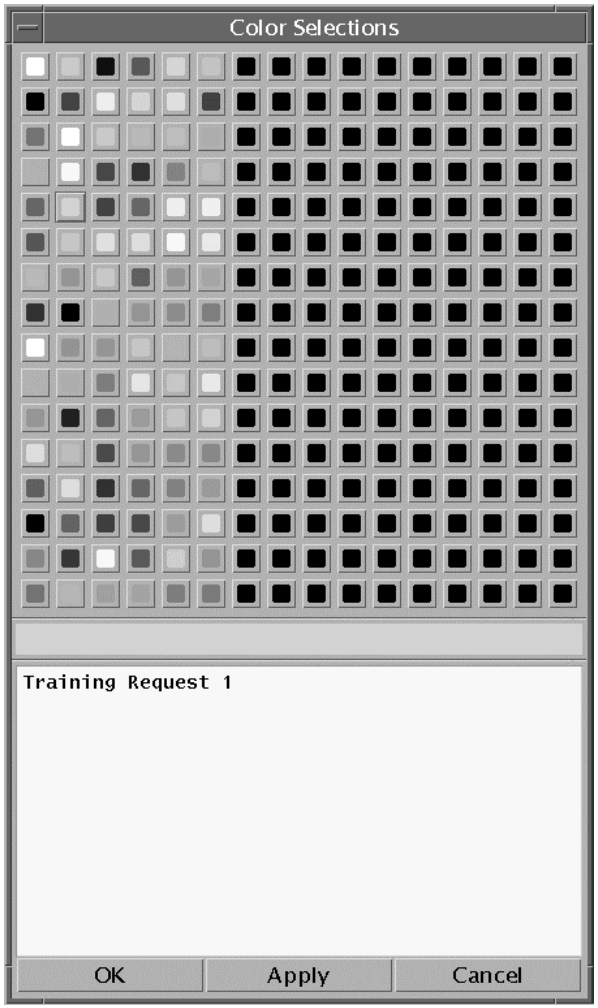
Resource Reservation Planning Master Timeline GUI



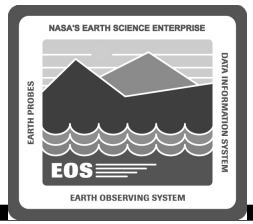
Resource Planning Timeline: Plan Window Edit Window

Resource Planning Timeline: Resource Edit Window

Resource Planning Timeline: Color Selections Window

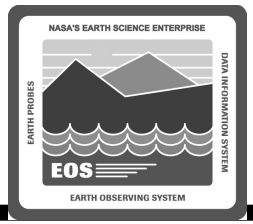


Tuning System Parameters



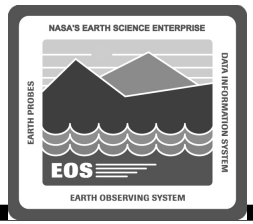
- **System parameters may be subject to control by Configuration Management (CM)**
  - **When making or requesting a change to system parameters, the CM process at the particular site must be followed (if applicable)**
- **Two types of places where parameters can be set:**
  - **PDPS database**
  - **Configuration files**
- **In general the system parameters in the database are modified using the GUI**
- **System parameters specified in configuration files are modified by editing the appropriate configuration file**

Tuning System Parameters (Cont.)



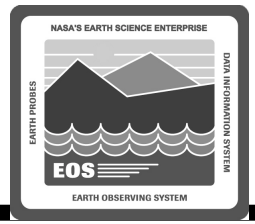
- **Configuration Registry**
  - **Scheduled for the second delivery of Release 5B**
  - **Significant change in the management of ECS configuration parameters**
    - » **Configuration Registry Server will provide a single interface for retrieving configuration attribute-value pairs for ECS servers from the Configuration Registry Database, via a Sybase server**
    - » **Configuration Registry Database will be loaded with data from the configuration files**
    - » **After the Configuration Registry is loaded the configuration files will be moved or renamed, making them inaccessible to the applicable servers**
    - » **When ECS servers are started they will access the Configuration Registry Database to obtain needed configuration parameters**

Tuning System Parameters (Cont.)



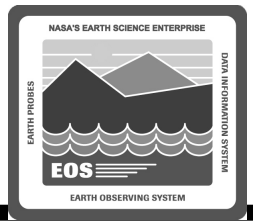
- **Configuration Registry (Cont.)**
  - **Database Administrator will have access to a Configuration Registry GUI for viewing and editing configuration data in the database**
  - **It will be necessary to coordinate with the Database Administrator when changes to configuration parameters are needed**
  - **Changes to configuration-controlled parameters are subject to approval through the site CM process**

Tuning System Parameters (Cont.)



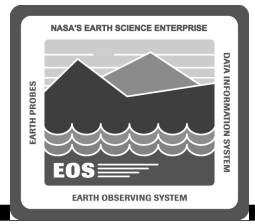
- **Tuning Parameters specified in configuration files**
  - **AppLogSize**
    - » **Maximum size of the application log (ALOG) file for the application in whose configuration file the parameter is specified**
  - **AppLogLevel**
    - » **Level of detail provided in the ALOG file for the application in whose configuration file the parameter is specified**
    - » **Setting of "0" provides the most data**
  - **DebugLevel**
    - » **Level of detail provided in the debug log file for the application in whose configuration file the parameter is specified**
    - » **Setting of "3" provides the most data**

Tuning System Parameters (Cont.)



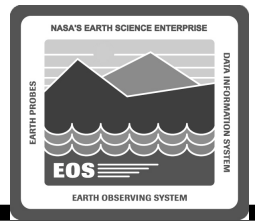
- **Tuning Parameters specified in configuration files (Cont.)**
  - **DpPr_MAX_RETRIES**
    - » **Number of retries to the Science Data Server for acquires/inserts before giving up**
  - **DpPr_WAIT_PERIOD**
    - » **Time (in seconds) to wait between retries to the Science Data Server**
  - **ListenThreads**
    - » **Number of listen threads assigned to the application in whose configuration file the parameter is specified**
  - **DpPrRM_MAX_RETRIES**
    - » **Number of retries when creating a Data Manager object (trying to allocate)**
  - **DpPrRM_RETRY_PERIOD**
    - » **Amount of time (in seconds) between retries when creating a Data Manager object (trying to allocate)**

Tuning System Parameters (Cont.)



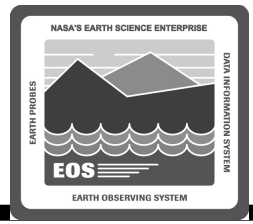
- **Tuning Parameters specified in configuration files (Cont.)**
  - **DpPrAutoSysMaxJobs**
    - » **Maximum number of jobs in AutoSys at one time**
    - » **Dividing the value assigned to DpPrAutoSysMaxJobs by eight produces the number of PGEs that can be in AutoSys at one time**
    - » **Changing the value assigned to DpPrAutoSysMaxJobs affects the number of jobs (for the applicable mode) allowed in AutoSys at a time**
    - » **DpPrAutoSysMaxJobs parameter and number of CPUs assigned to the mode should be adjusted as necessary to ensure that all CPUs can be used but AutoSys is not overloaded with jobs waiting to be processed**

Tuning System Parameters (Cont.)



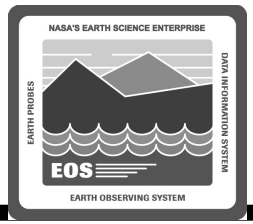
- **Tuning Parameters specified in configuration files (Cont.)**
  - **MaxSlippagePerc**
    - » **Percentage by which a granule can slip and still be considered a match**
  - **AcceptableCertainty**
    - » **Minimum overlap a granule must have**
  - **DBConnections**
    - » **Number of connections needed by the application in whose configuration file the parameter is specified. Subscription Manager maintains only one connection to the database**

Tuning System Parameters (Cont.)



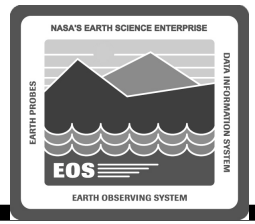
- **Tuning Parameters specified in configuration files (Cont.)**
  - **SleepDelayForFailures**
    - » **Amount of time (in seconds) to wait before reprocessing failed notifications**
    - » **If the specified value is less than 60, a default value of 60 seconds would be assumed**
  - **SleepDelayForTimers**
    - » **Amount of time (in seconds) the Subscription Manager should sleep between checking for expired timers**
    - » **Should be set to the minimum amount of time a timer will be set for at this DAAC**
    - » **Minimum it can be set to is 60 seconds**

Tuning System Parameters (Cont.)



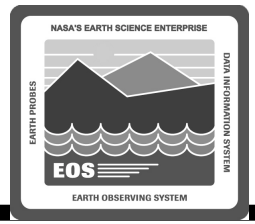
- **Tuning Parameters specified in configuration files (Cont.)**
  - **Default and adjusted values vary from site to site**
  - **Values listed in the table in the text are provided as examples only**
  - **Refer to the appropriate 920- TDx- 013 Custom Code Configuration Parameters document**
    - » **Documents are available at URL http://cmdm.east.hitc.com/baseline/ under "Technical Documents"**

Modifying System Parameters in Configuration Files



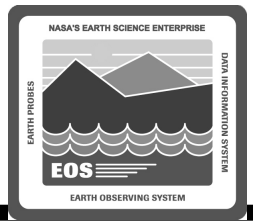
- **Procedure**
  - **Access the command shell**
  - **Set the DISPLAY environmental variable**
  - **Log in to the Planning/Management Workstation, Queuing Server, or PDPS DBMS Server as applicable using secure shell**
  - **Change directory to the directory containing the applicable .CFG file**
  - **Use the vi editor to find the parameter to be changed and replace the existing value with the desired value**
  - **Save the edited file**

Modifying System Parameters in Configuration Files (Cont.)



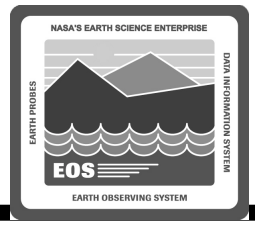
- When the value assigned to a parameter in a configuration file has been changed and saved, the modified value does not take effect until the affected server has been restarted
- Example
  - Debug level for the Subscription Manager log has been changed from “2” to “3” in the Subscription Manager configuration file
  - Modification does not affect the recording of data in the log until after a warm restart of the Subscription Manager (at which time the server would read the configuration file)

Tuning System Parameters (Cont.)



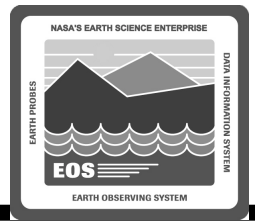
- **Production Planner and Production Monitor should work with the Resource Planner to make optimum use of processing resources**
  - **Resource Planner allocates the disk partitions, CPUs, and RAM available for processing among the active modes (e.g., OPS, TS1, TS2)**
  - **Production Planner and Production Monitor monitor the load on the processing resources**

Tuning System Parameters (Cont.)



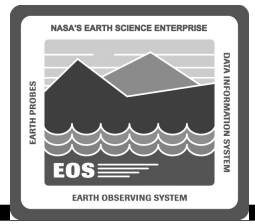
- **Resource Planner assigns the bulk (typically 60% - 80%) of the processing resources to the OPS mode**
  - **The remainder of the processing assets are divided among the modes used for SSI&T and new version software checkout**
- **The Production Planner and Production Monitor monitor the load on the processing resources to identify whether the actual load is appropriately distributed among modes**
  - **They may either…**
    - » **Inform the Resource Planner of under- or over-use of resources as allocated**
    - » **Have the DpPrAutoSysMaxJobs variable in the EcDpPrJobMgmt.CFG file adjusted**

Tuning System Parameters (Cont.)



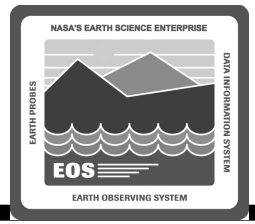
- **Disk space allocation**
  - **Disk space allocated to OPS mode is likely to be used to capacity**
  - **Disk space assigned to the other two modes may not fill up**
- **CPU allocation**
  - **There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor**
  - **The operating system(OS) takes care of true CPU and RAM allocation**
    - » **Actual CPU usage during processing is limited by OS**
    - » **If ten CPUs have been specified for a particular mode, only ten DPRs can be running the Execute job at a given time**
    - » **What is really being defined is the maximum number of DPRs that will execute at a given time**

Tuning System Parameters (Cont.)



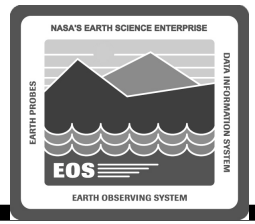
- **CPU allocation (Cont.)**
  - **CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor**
    - » **If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased**
    - » **If the science processor is at full capacity when OPS mode is at full processing capacity (and the processor may be overworked) the number of CPUs allocated to OPS mode should be reduced**
- **Random-access memory (RAM) allocation**
  - **Subject to the same considerations as CPUs**
  - **RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor**

Tuning System Parameters (Cont.)



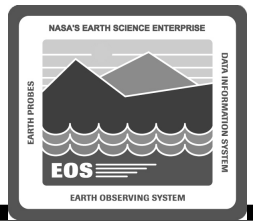
- **Throttling of the processing load through the DpPrAutoSysMaxJobs variable**
  - **Defined in the EcDpPrJobMgmt.CFG file in the /usr/ecs/MODE/CUSTOM/cfg directory on the Queuing Server (e.g., g0sps06)**
  - **If DpPrAutoSysMaxJobs in OPS mode is set at 64 (allowing AutoSys to accommodate eight DPRs simultaneously in OPS mode) and ten CPUs are defined for OPS, all ten CPUs would not be utilized**
  - **If the value of DpPrAutosysMaxJobs were increased to 120 (15 DPRs), there might be times when the processing of some DPRs was held up because only ten could be in Execute at a time**
    - » **In such a case it might be possible to increase the number of CPUs allocated to the mode so that more than ten DPRs could be running the Execute job simultaneously**

Troubleshooting Resource Planning Problems



- **Troubleshooting**
  - **Process of identifying the source of problems on the basis of observed trouble symptoms**
  - **Problems with Resource Planning can usually be traced to either some part of the Planning Subsystem or the ECS infrastructure**
    - » **Resource Planning does not have interfaces with many other subsystems**
    - » **System Management Subsystem (MSS) is the primary exception**

Troubleshooting Resource Planning Problems (Cont.)



- **Troubleshooting table**
  - **Describes actions to be taken in response to some common Resource Planning problems**
  - **If the problem cannot be identified and fixed without help within a reasonable period of time, call the help desk and submit a trouble ticket in accordance with site Problem Management policy**

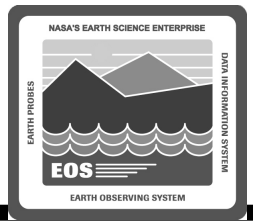
Troubleshooting Resource Planning Problems (Cont.)

Symptom	Response
Unable to log in to the Planning Subsystem host (e.g., g0pls01).	Check with the Operations Controller/System Administrator to ensure that the host is “up."
GUI not displayed when the start-up script has been properly invoked.	Ensure that the DISPLAY variable was set properly. [For detailed instructions refer to the procedure for **Launching Resource Planning Applications Using UNIX Commands** (previous section of this lesson).]
Error message indicating that SNS (System Name Server) and/or Resource Model is/are in use using the selected Application ID.	1. Use another Application ID if working in a different mode from the person using the selected Application ID. 2. If working in the same mode as the other user, coordinate use of Planning applications with the other user and/or the System Administrator. [For detailed instructions refer to the procedure for **Launching Resource Planning Applications Using UNIX Commands** (previous section of this lesson).]

Troubleshooting Resource Planning Problems (Cont.)

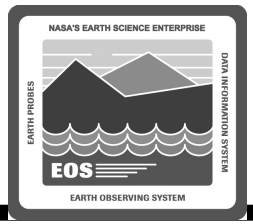
Symptom	Response
Error message associated with the Resource Editor.	Refer to Table 5, Resource Editor User Messages (adapted from the corresponding table in 609-CD-510-001, *Release 5B Operations Tools Manual for the ECS Project*).
Error message associated with the Resource Scheduler.	Refer to Table 6, Resource Scheduler User Messages (adapted from the corresponding table in 609-CD-510-001, *Release 5B Operations Tools Manual for the ECS Project*).
Other problems.	Check the log files (e.g., EcPlRpRe.ALOG, EcPlRpSi.ALOG, EcPlRpRm.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the procedure for **Checking Log Files** (subsequent section of this lesson).]

Checking Log Files



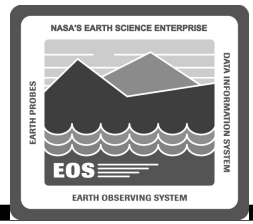
- **Log files can provide indications of the following types of problems:**
  - **DCE problems**
  - **Database problems**
  - **Lack of disk space**

Checking Log Files (Cont.)



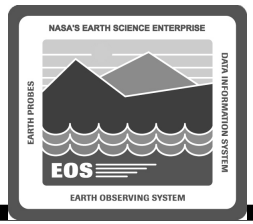
- **Procedure**
  - **Access a terminal window logged in to the appropriate host**
  - **Change directory to the directory containing the resource planning log files**
    - » **/usr/ecs/*MODE*/CUSTOM/logs**
  - **Review log file to identify problems**
    - » **EcPlRpRe.ALOG**
    - » **EcPlRpSi.ALOG**
    - » **EcPlRpRm.ALOG**
  - **Respond to problems**

Checking Database Connections



- **PDPS database**
  - **Repository of data concerning planning and processing**
  - **If applications are unable to connect to the database, the data cannot be retrieved or displayed on the GUI**
  - **Checking the database connections is a logical step in trying to isolate the following types of problems:**
    - » **GUI does not display data**
    - » **Display does not refresh**

Checking Database Connections



- **Procedure**
  - **Review the configuration file to identify the values for the following parameters:**
    - » **DBName**
    - » **DBServer**
    - » **DBMaxConnections**
  - **Use the isql sp_who command to obtain a list of actual connections**
  - **Use the isql sp_configure command to obtain a list of the number of connections for which the database has been configured**
  - **Compare the number of actual connections (results of sp_who) with the number of connections for which the database has been configured (results of sp_configure "user connections")**
  - **Notify the Database Administrator of problems**